COAL AGE

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# The Enlistment of Shorty McGee

By Gilbert Fletcher

I WANTED to jine with the army,
Or the navy, said Shorty McGee,
But the guys what was doin' recruitin'
Didn't seem to be crazy fer me.
They kicked 'cause I wasn't a scholar,
They said I was way under size,
And they hung out the crape on my cravings,
When they found I was weak in the eyes.

SO I pulled my freight back to the pit mouth,
To the gloom and a rank smellin' hole,
With a cuss at my eyes and my inches,
And an oath at the tools and the coal.
And wrath, plain wrath fer the thick heads
That headed a runt fer the mine,
And gave him a pick and a shovel
When he asked fer a gun in the line.

IT was coal that they wanted to win it,
So I'm gettin' it out on the run,
And it's keeping things warm fer the Allies
And it's making them hot fer the Hun.

Yea boy, it's a line I'm a-holdin',
Jest bet yer best boots I will stick,
Fer if I can't shoot I can shovel,
I can blast and can handle the pick.

I'M wading coal out by the carload,
Too busy to stop or to strike,
I'm doing my bit fer the Allies
A-workin' the way I would fight.
Each lump that I throw in the coal car
Is a missile slam-bang to its mark,
It ain't any haphazard business
Like chucking grenades in the dark.

IF I am a bit short fer a soldier,
And my eyes seem to be on the bum,
I can delve into coal with a shovel,
With the zeal I would carry a gun.
So it's stick to the diggin's fer us boys,
And sure we'll be doin' two bits,
In keeping things right fer the Allies
By coaling up Hades fer Fritz.

# IDEAS AND SUGGESTIONS

FIG. 1 AND 3 Key-pulling Devices
FIG. 2 " 4 Driving Bushings home with Chain and Jack
FIG. 5 Cutting long Oilgroove by Hand
FIG. 6 AND 7 Placing a Bushing: Wrong Way-Driving. Right Way-Pulling
FIG. 8 AND 9 Extracting Bushings in Close Quarters

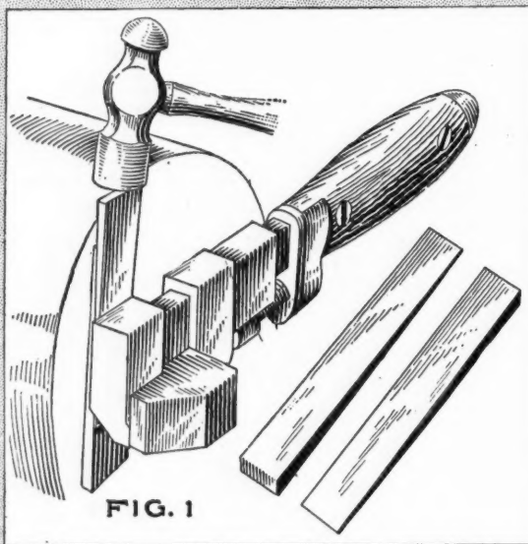

FIG. 1

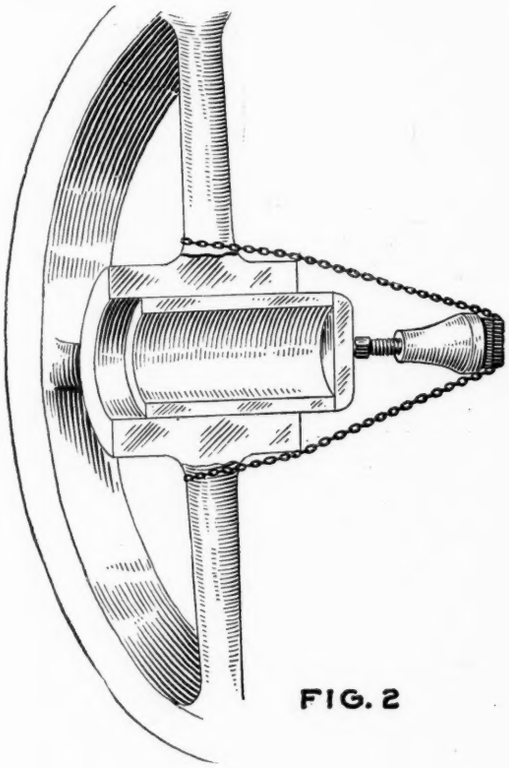

FIG. 2

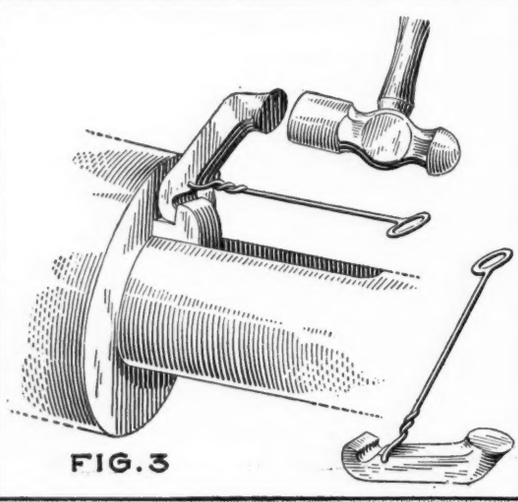

FIG. 3

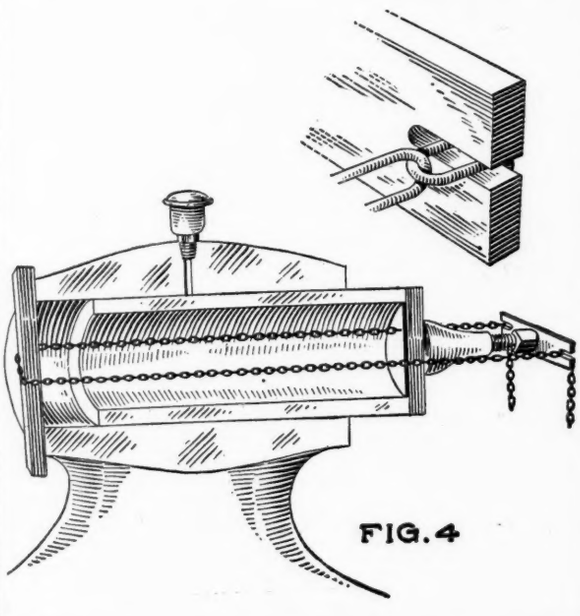

FIG. 4

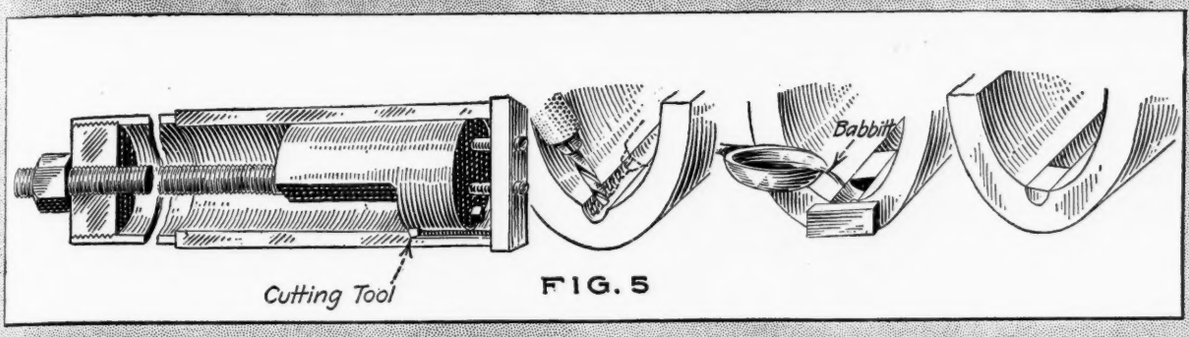


FIG. 5

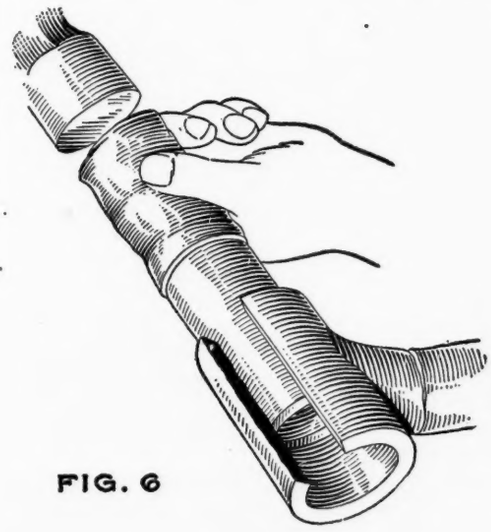

FIG. 6

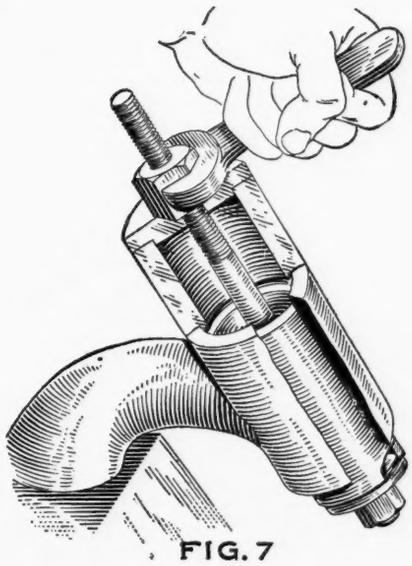

FIG. 7

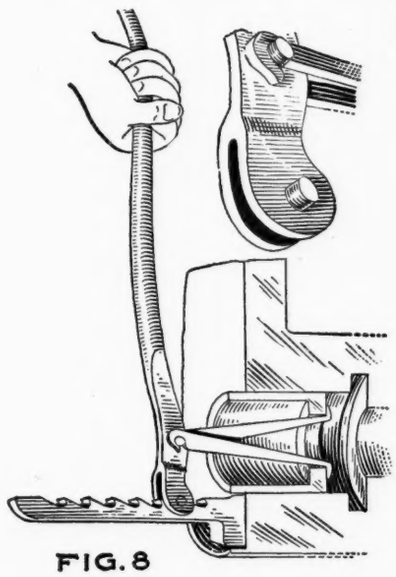

FIG. 8

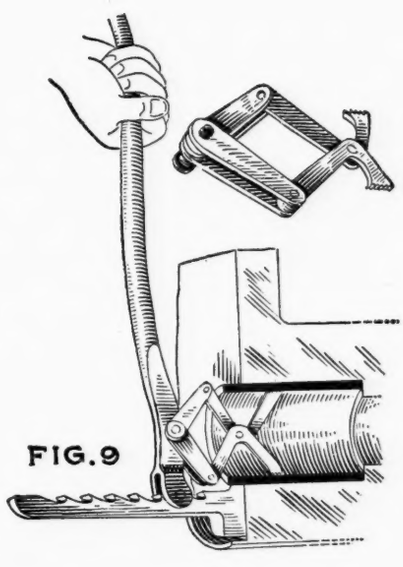

FIG. 9

# Peabody Coal Development in Central Illinois

By GEORGE W. HARRIS
Editorial Staff, "Coal Age"

FIG. 1. TIPPLE AT MINE NO. 7 OF THE PEABODY COAL CO., KINCAID, ILLINOIS

BIG coal producers do not spring up overnight like mushrooms. Neither do they continue in the first class unless the management provides for systematic development along uptodate lines in which full advantage is taken of every opportunity to secure tonnage. It is interesting to note how the leaders do things. In a coal state of the importance and potentiality of Illinois, there are a number of large coal interests which have under way some big plants in different stages of development. Among these mining companies is the Peabody Coal Co., one of the leading miners and shippers of the state as regards modern equipment and aggregate tonnage; its eleven mines shipped 4,310,000 tons for the year ended Dec. 31, 1917.

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PROMINENT among the mines of the Peabody Coal Co., of Chicago, Ill., is a group of plants on the Chicago & Illinois Midland R.R., within 20 miles of Springfield, Ill. This short line of road does not attract much attention on the Chicago or New York exchanges, but it is of far more interest to the Peabody company than some of the big railroads which are prominent at these stock exchange centers. The Chicago & Illinois Midland R.R. interchanges with the Baltimore & Ohio and the Wabash R.R. at Taylorville to the east, with the Illinois Central at Pawnee Junction, with the Chicago & Alton at Auburn, and the Chicago & Northwestern at Compro, to the west of the plants in question. This belt line of about 26 miles in length furnishes traffic connection for the Peabody mines along the line of the road with the trunk railroads noted. Seven miles west of Taylorville on the Central & Illinois Midland R.R. is the mining town of Kincaid; to the east of this town is the No. 7 mine of the Peabody Coal Co., to the west is No. 8, and about halfway between Kincaid and Taylorville is No. 9—the latter in embryo.

Standardization of machine parts has been practiced in this country for some time, but the same policy seems somewhat novel when applied to coal plants. Nevertheless this principle seems to have been adopted in the case of the three plants just noted. No. 7 main shaft was sunk in the fall of 1911 and is 349 ft. deep to the No. 6 seam; shaft No. 8 was sunk the following year, reaching coal at a depth of 358 ft.; No. 9 has only recently struck coal at 417 ft. below the surface. The No. 7 and No. 8 shafts and equipment are in duplicate practically in every particular, and No. 9 is laid out on the same lines. It would hardly be practicable to carry out a plan of this kind in some mining sections. But in the prairie state of Illinois the surface topography permits of plant location almost

at will, and the regular seams readily adapt themselves to a standard plan of development.

The No. 7 and No. 8 mines of the Peabody Coal Co. are in Christian County. These two plants and a third mine at Stonington (Peabody No. 21), eight miles northeast of Taylorville, produced 1,747,292 tons of coal for the year ended June 30, 1917. This tonnage was all machine-mined. By contrast the remaining six commercial shipping mines in this county produced only 1,074,875 tons during the same period; and of this amount only half the product of one mine (34,382 tons) was machine-mined coal—practically the whole output was mined by hand. In view of the fact that Peabody No. 7 and No. 8 mines are duplicates of each other, only the No. 7 plant is illustrated and described in this article. The capacity of No. 7 mine is 4000 tons of coal in eight hours. The tipple at this mine is shown in perspective in Figs. 1 and 3, and in section in Fig. 2. The tipple is steel throughout and most of the main members are of built-up construction. The main posts and beams are latticed channels; other members are built up with angles and lacing, and some I-beams are used as struts. The main tipple is covered with corrugated-iron siding, as shown in the illustrations. From the surface to the center of the sheave wheel at the shaft is a distance of 90 ft. The tipple was built by the Decatur Bridge Co., of Decatur, Illinois.

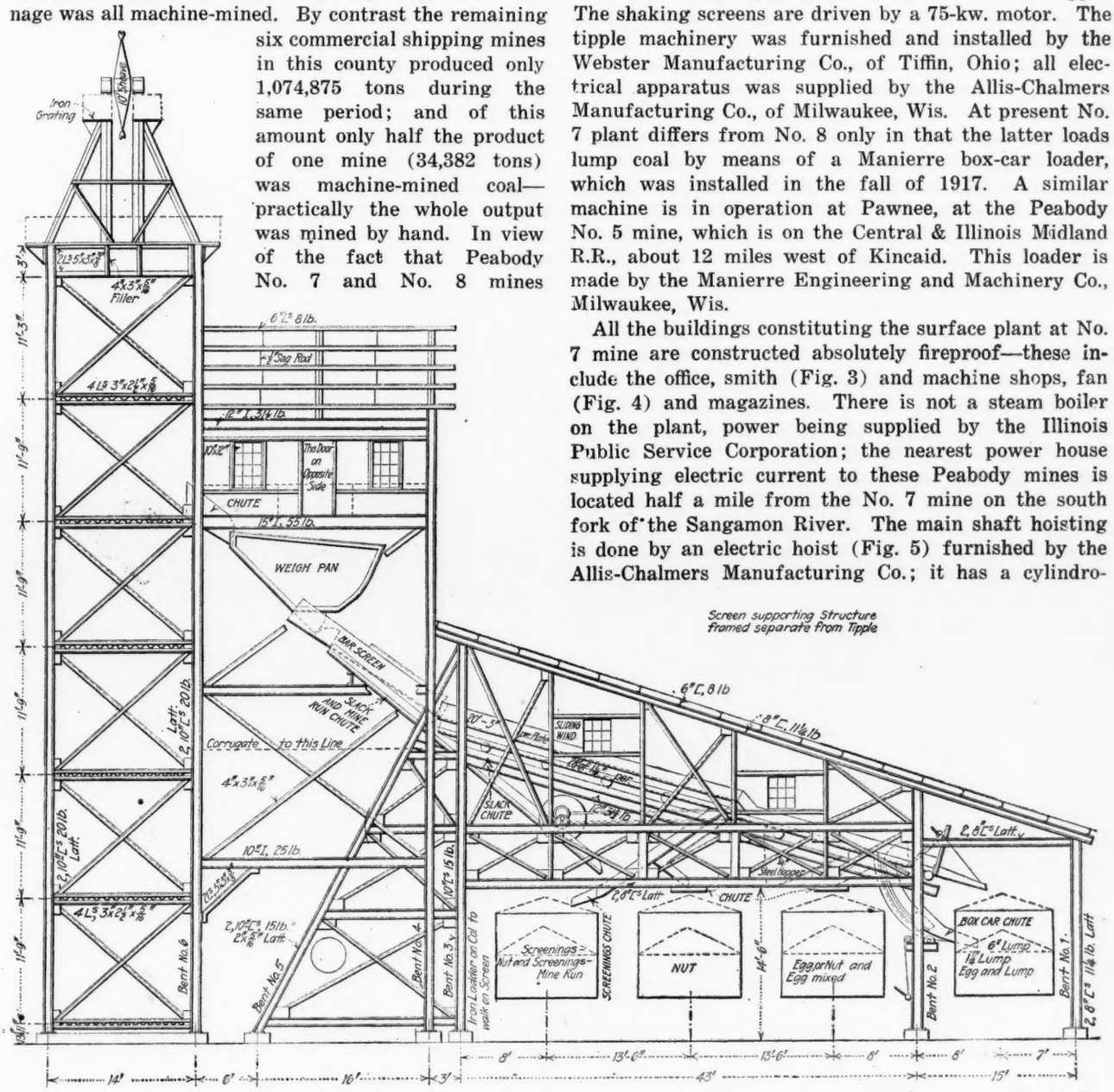



FIG. 2. LONGITUDINAL SECTION OF HEAD FRAME AND TIPPLE, SHOWING LOCATION OF CHUTES AT MINE NO. 7, PEABODY COAL COMPANY

The arrangement of the screens and the sizes and grades of coal loaded at this four-track tipple are shown on the section, Fig. 2. The screen-supporting structure is framed separate from the rest of the tipple. The shaking screens are driven by a 75-kw. motor. The tipple machinery was furnished and installed by the Webster Manufacturing Co., of Tiffin, Ohio; all electrical apparatus was supplied by the Allis-Chalmers Manufacturing Co., of Milwaukee, Wis. At present No. 7 plant differs from No. 8 only in that the latter loads lump coal by means of a Manierre box-car loader, which was installed in the fall of 1917. A similar machine is in operation at Pawnee, at the Peabody No. 5 mine, which is on the Central & Illinois Midland R.R., about 12 miles west of Kincaid. This loader is made by the Manierre Engineering and Machinery Co., Milwaukee, Wis.

All the buildings constituting the surface plant at No. 7 mine are constructed absolutely fireproof—these include the office, smith (Fig. 3) and machine shops, fan (Fig. 4) and magazines. There is not a steam boiler on the plant, power being supplied by the Illinois Public Service Corporation; the nearest power house supplying electric current to these Peabody mines is located half a mile from the No. 7 mine on the south fork of the Sangamon River. The main shaft hoisting is done by an electric hoist (Fig. 5) furnished by the Allis-Chalmers Manufacturing Co.; it has a cylindro-conical drum and is equipped with modern safety devices.

On descending the shaft the same modern construction evident about the rest of the plant can be noted—in the concrete lining, the steel I-beam buntons and the 70-lb. T-rail guides. The main shaft is 17 ft. 8 in. by 10 ft. in dimension; the air shaft measures 16 x 10 ft. inside—there is a 10 x 10-ft. air compartment and a 6 x 10-ft. stairway partitioned off by a 6-in. concrete curtain wall. The air shaft is concrete throughout. The 12-ft. Jeffrey steel-cased fan at this shaft

runs at high speed and supplies 250,000 cu.ft. of air per minute to the mine workings.

A strategic point about a high production plant is the shaft bottom. Through this lower end of the bottle's neck passes the tonnage of the mine, and any congestion here limits the production of the plant. The capacity of the shaft is greatly increased by attention to details of hoisting, haulage and the facilities at and around the bottom itself.

All these factors so vitally affecting the shipment of coal are interdependent. In Fig. 6 is shown the bottom at No. 7 mine viewed from the empty side. The diamond cross-over is prominent in the foreground. On the opposite side of the shaft automatic safety mine-car cagers are installed, made by the Mining Safety Device Co., of Bowerston, Ohio.

Both loaded and empty cars are handled by gravity, the former being delivered on the Oleson self-dumping cages (made by the Eagle Iron Works, Des Moines, Iowa) by the automatic cager, a device contributing greatly to safety and speed of operation. The empty pit cars, pushed off the cage by the loaded ones, run onto the empty tracks and around to each side of the shaft by gravity; here they are made up into trips which are picked up by motors.

Four-ton end-gate cars are used. In order to get the proper grades at the loaded and empty tracks, bottom rock was blown up on either side of the shaft; side retaining walls of concrete were then built, on top of which were set 12 x 12-in. posts to support the 12-in. I-beams holding up the limestone roof. All these features are brought out in Fig. 6. This illustration shows that the local underground artist has improved his opportunity to decorate the concrete side retaining walls with frescoes—someone also had a literary turn of mind.

The No. 6 seam at this group of Peabody mines has an average thickness of 7 ft. 6 in. and a good top.

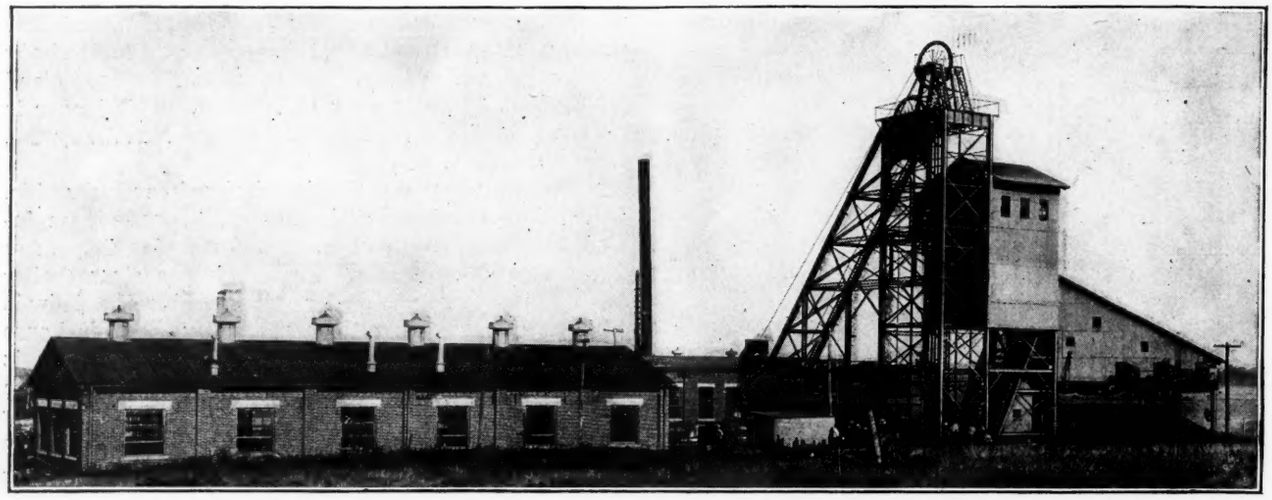


FIG. 3. BLACKSMITH SHOP AND TIPPLE AT MINE NO. 7 OF PEABODY COAL COMPANY—ALL FIREPROOF

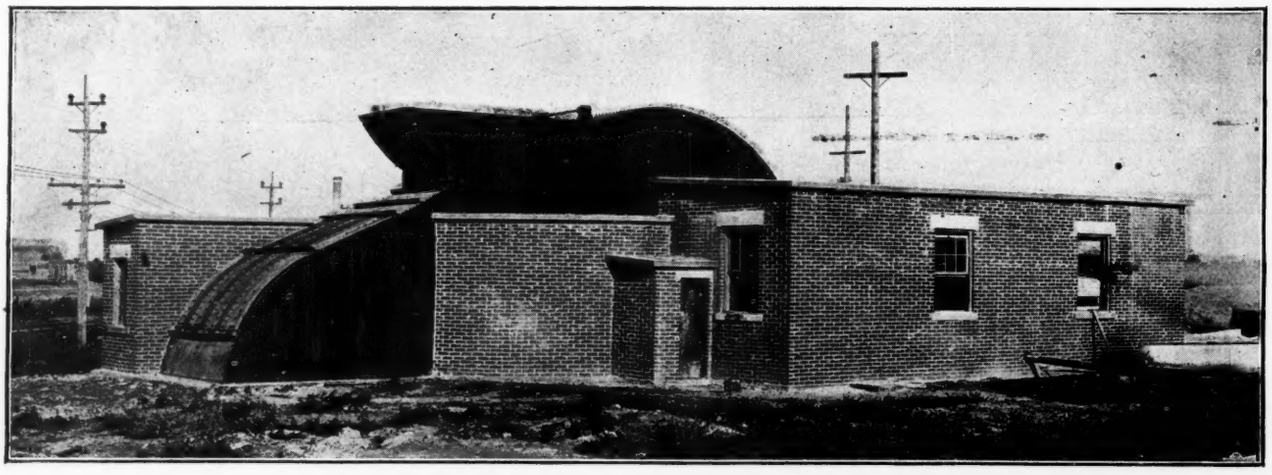


FIG. 4. FAN AT MINE NO. 7 OF PEABODY COAL COMPANY

The mines here are worked on the room-and-pillar panel method of mining. The east and west main entries are driven on the three-entry system—a haulage way in the middle and an airway on either side. Double entries branch out from the main entries. A 100-ft. barrier pillar is left between the first room in a panel and the nearest entry. Rooms in one panel do not hole through at the face to the rooms of an opposite panel ahead. Rooms are driven on 55-ft. centers with 30-ft. room width and 25-ft. pillars; entries are 12 ft. wide.

All operations are conducted electrically at Mine

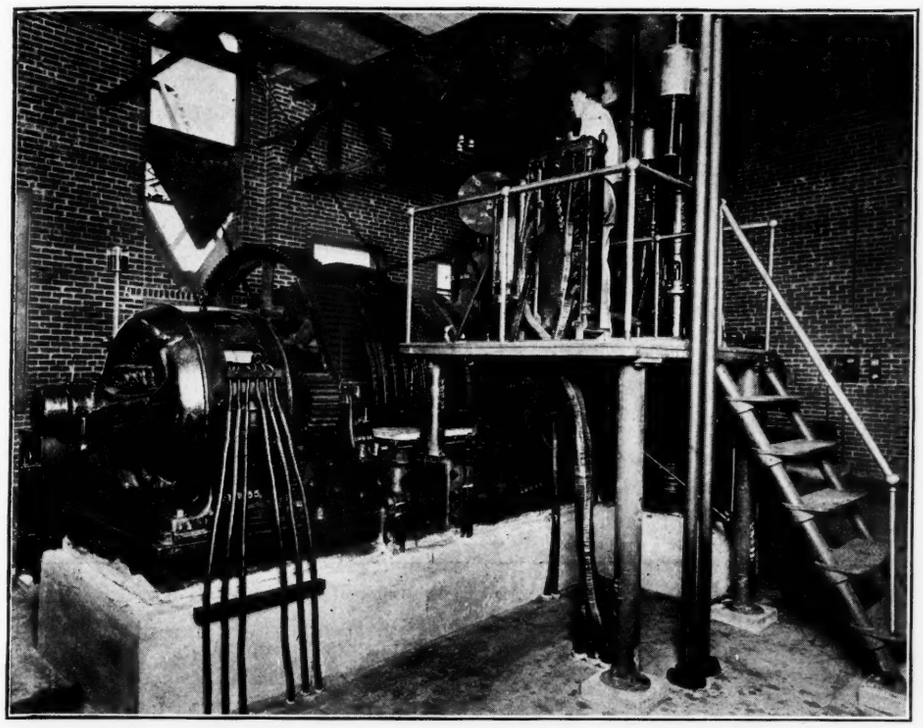


FIG. 5. MAIN HOIST AT MINE NO. 7, KINCAID, ILLINOIS

No. 7. On the surface this power is used as noted. Underground the haulage is done by General Electric motors—13-ton locomotives for main-line work and six-ton motors for gathering cars from rooms and delivering to partings. All coal is cut by electrical mining machines, distributed as follows: Twenty Sullivan shortwall machines are used on territory work and entries are driven by 12 Morgan-Gardner machines.

No pillars are drawn in this field, which is rather unfortunate. Everything being equal it costs no more to drive an entry looking to 90 per cent. recovery of coal in the territory opened up than for 50 per cent. The expense of narrow work charged up against 9000 tons of coal mined is considerably less per ton than when only 5000 tons are recovered. Many operators consider that coal of the thickness of that worked in Mine No. 7 is almost ideal as regards profitable mining. However, it is difficult to take full advantage of these favorable conditions at times. The same trouble is experienced here as in most other sections of Illinois, where a comparatively low percentage of coal recovery has been maintained.

According to the 1910 census reports, the average value of surface in Christian County, Illinois, is $123.63 per acre. This is among the best land in the state, and when subsidence of surface occurs as a result of mining which brings down the top then heavy damages are claimed by the owners of surface thus disturbed.

A natural consequence is to leave sufficient coal in the ground in the form of pillars which will prevent a break in or settlement of the top rock. This subject has been touched on in *Coal Age* before, but the importance of the matter is such that a further discussion of similar cases is warranted. A most interesting bulletin on the "Percentage of Extraction of Bituminous Coal with Special Reference to Illinois Conditions," by C. M. Young, of the University of Illinois, reports on the results of investigations which have been going on recently. This bulletin notes that in the district, of which Christian County is a part, the Peabody Coal Co. reports extractions at its mines of 65, 62, 60 and 70 per cent. respectively.

Every year the housing problem at mines receives more and more attention. The majority of the miners at No. 7 and No. 8 Peabody mines own their own homes, which were purchased from the company. The mining town of Kincaid is on the other side of the track from No. 7 shaft, and No. 8 is only 1½ miles distant; it has a population of about 2000. Building

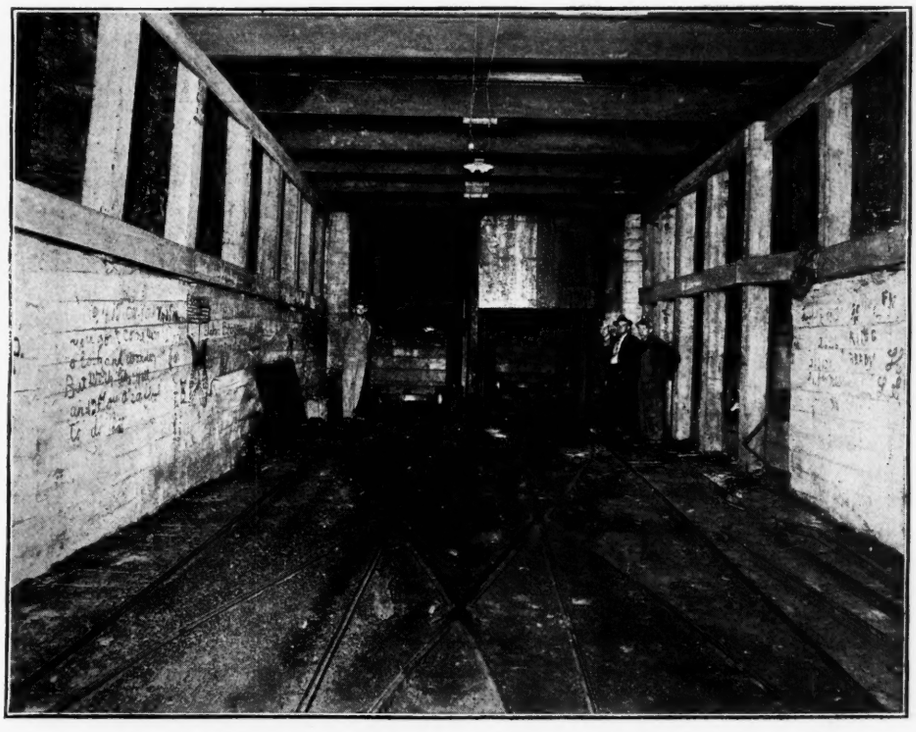


FIG. 6. SHAFT BOTTOM, EMPTY SIDE OF MINE NO. 7, PEABODY COAL COMPANY

restrictions are attached to transfers of land and vary according to the value and location of the lot. The restrictions include the erection of brick business buildings, the exclusion of saloons, gambling houses and so on. The miners can build their houses of wood. A hotel and a large foundry and machine shop have been built in the town; the latter is about to double its capacity.

Often of equal importance to an operator with the technical side of mining are commercial problems—markets and car supply. At present the market for a given coal is determined by the zoning system, and operators and men are struggling to the limit to supply coal. Dr. F. C. Honnold, Production Manager for Illinois, has stated that if the domestic consumer would accept all grades of coal it would greatly help production—that screenings on hand retard production. It is due to the discrimination of the private consumer of coal in Illinois as to the kind preferred which has led to the preparation of the "57 varieties" which have been placed on the market. One solution of the abnormal demand for domestic coal in Illinois, in Dr. Honnold's estimation, would be the acceptance of mine run by the private consumer—its use has been urged.

Now that production is receiving so much attention, all the factors entering into the tonnage problem are given most careful consideration. Prominent among these are labor and transportation, and they are much more closely related than might appear on the surface. It is now the policy of the Peabody company to provide an opportunity at each of its mines to ship over several roads. Miners tend to go to those mines where they can get the most steady work. The mines on the Central & Illinois Midland R.R. have had a particularly good car supply, operating at best from 75 to 80 per cent. of the time. It is difficult to hold men and keep up an efficient organization where the car supply is unsteady; when a mine works only two or three days a week it is not at all satisfactory to the miners, who leave and go to a mine where steady work is obtainable.

The Peabody company stated last spring that it had lost 20 to 30 per cent. of possible production on account of labor shortage due to insufficient car supply. The consumption of coal has increased enormously during the last two years; new mines have been opened up and existing plants have improved their facilities for increasing output. On the other hand, available labor of mining caliber has decreased, and the car renewals on the railroads have hardly more than replaced worn-out rolling stock. In view of the present tax on the facilities of the transportation lines in other directions, improved service will have to compensate for deficiencies in cars and locomotives if the operators are to ship the quantity of coal necessary to meet this year's requirements.

For the facts forming the basis of this article and the illustrations accompanying it, the writer is indebted to various officials of the Peabody Coal Co., who courteously furnished the information.

## Soft Coal Loadings at Lake Erie Docks

To Oct. 1 the Great Lakes fleet had taken on exactly 20,756,057.04 net tons of bituminous coal for the Northwest, according to the official statement of the Coal and Ore Exchange, Cleveland. Since the Federal Fuel Administration's schedule calls for a total movement of 28,000,000 net tons of bituminous this season, and October is down for 3,500,000 tons and November for 2,400,000 tons, the Northwest is behind 1,343,942.96 tons. December, however, was left open by the Federal Fuel Administration, and since operators are figuring on moving at least as much coal as in last December—when the movement was about 660,000 tons—the lake trade is about 700,000 tons behind schedule.

In addition to the 20,756,057.04 tons of cargo coal loaded at Lake Erie ports for the season to Oct. 1 the total of vessel fuel loaded is 928,778.90 tons, making a grand total of 21,684,835.94 net tons of bituminous handled at the docks from the opening of navigation to the first of October.

Cargo coal loaded in September amounted to 4,666,545.10 tons and vessel fuel, 184,652.80 tons, making a total of 4,851,197.90 net tons for the month. The schedule called for 4,900,000 tons of cargo coal. Toledo again led, with a total of 1,754,641.15 tons at the three docks; Lorain was second with 608,186.80 tons; Ashtabula was third with 622,990.30 tons, and Cleveland fourth with 552,087.55 tons.

The accompanying table, the official compilation of the Coal and Ore Exchange, which is handling the Great Lakes vessel pool, gives the statistics in detail:

BITUMINOUS COAL LOADED AT LAKE ERIE DOCKS

| Port | Dock | During September | | | Season to Sept. 30 | | |
|---|---|---|---|---|---|---|---|
| | | Cargo | Vessel Fuel | Total | Cargo | Vessel Fuel | Total |
| Toledo | B. & O. | 578,751.55 | 14,793.50 | 593,545.05 | 2,137,271.20 | 45,523.80 | 2,180,795.00 |
| Toledo | H. V. | 798,782.80 | 22,160.40 | 820,943.20 | 3,600,207.60 | 104,176.05 | 3,704,383.65 |
| Toledo | T. & O. C. | 332,116.90 | 8,037.00 | 340,153.90 | 1,598,690.00 | 43,616.15 | 1,642,306.15 |
| Sandusky | Penna. | 420,811.30 | 10,294.95 | 431,106.25 | 1,764,408.20 | 44,241.10 | 1,808,649.30 |
| Huron | W. & L. E. | 313,773.30 | 9,957.40 | 323,730.70 | 1,605,074.85 | 57,561.70 | 1,662,636.55 |
| Lorain | B. & O. | 592,724.55 | 15,462.25 | 608,186.80 | 2,373,539.30 | 67,955.25 | 2,441,494.55 |
| Cleveland | Erie | 98,843.00 | 3,355.45 | 102,198.45 | 487,350.95 | 16,128.15 | 503,479.10 |
| Cleveland | Penna. | 411,253.65 | 38,635.45 | 449,889.10 | 1,900,575.54 | 224,241.90 | 2,124,817.44 |
| Fairport | B. & O. | 44,152.40 | 6,367.50 | 50,519.90 | 149,324.65 | 34,126.20 | 183,450.85 |
| Ashtabula | N. Y. C. | 330,992.05 | 30,157.30 | 361,149.35 | 1,535,289.55 | 164,163.15 | 1,699,452.70 |
| Ashtabula | Penna. | 249,436.20 | 12,404.75 | 261,840.95 | 1,027,956.55 | 62,929.55 | 1,090,886.10 |
| Conneaut | B. & L. E. | 329,104.90 | 4,145.80 | 333,250.70 | 1,730,437.40 | 25,455.70 | 1,755,893.10 |
| Erie | East | 84,953.65 | 4,055.35 | 89,009.00 | 512,942.45 | 30,651.20 | 543,593.65 |
| Erie | Pa. West | 80,848.85 | 4,825.70 | 85,674.55 | 332,988.80 | 10,009.00 | 342,997.80 |
| Total | | 4,666,545.10 | 184,652.80 | 4,851,197.90 | 20,756,057.04 | 928,778.90 | 21,684,835.94 |

The bituminous coal movement by months, according to the Coal and Ore Exchange, has been as follows: April, 868,852.64 tons; May, 3,194,198.10; June, 3,539,352.30; July, 4,234,305.05; August, 4,996,929.95, and September, 4,851,197.90. Vessel fuel is included in these figures.

If the 34,000,000 tons of coke made in beehive ovens in 1917 had been made in the byproduct type, some 750 million cubic feet of gas would have been saved, according to estimate, every 24 hours. From this gas about 65 million gallons of benzol might have been recovered.

# Low-Temperature Distillation of Illinois and Indiana Coals

By G. W. TRAER

SYNOPSIS—*This article is an abstract of a paper presented at the October, 1918, meeting of the American Institute of Mining Engineers at Milwaukee. It gives an account of some remarkable results. A semi-coke averaging 18 per cent. volatile matter was made in cast-iron containers that were pushed consecutively through the ovens. By this process it is estimated that nearly 20 gal. of gasoline as well as other valuable byproducts can be made from one ton of Illinois coal.*

THE distillation of bituminous coals at what is commonly termed low temperature, and the quantities, nature and adaptabilities of the products evolved have been the subject of considerable experimentation during recent years. Fortunately, the earlier work in this country was done by men whose scientific training qualified them properly to record and interpret the results of their experiments. The work of Professor Parr, of the University of Illinois, is especially notable in this respect.

Professor Parr's work, added to that of English experimenters, demonstrated certain things to a degree which is generally regarded as convincing. They have proved that a caking bituminous coal, when subjected to a temperature of not more than 1000 deg. F. (preferably somewhat less) will yield light tar having low specific gravity (about 1.06) and high commercial value; also, that this yield, with a given coal, will depend upon the percentage of hydrocarbons in the coal, the maximum temperature used, and the promptness with which the distillate gases are removed. It is assumed that air is excluded from the retort, and that the coal is subjected to heat for a sufficient time to drive off all of the tarry hydrocarbons. It is the purpose in this paper to describe other work of a practical nature, directed toward the commercial adaptation of these principles, which was begun nearly two years ago; this investigation was assisted by A. J. Sayers, of the Link-Belt Co., and Carl Scholz.

The first step was to draft tentative designs for the handling of the coal and coke so as to produce a coke having a suitable structure for sizing, storage, shipment and handling, without the necessity of briquetting. Professor Parr's results had indicated that the rather open-pored volatile coke produced by him had a low ignition point, which would contribute toward easy control of the fire in stoves, house furnaces, fireboxes and boilers. It is recognized by those experienced in the marketing of fuels that the hard non-volatile coke from the high-temperature process falls far short of being an ideal domestic fuel. The high ignition point of hard non-volatile coke makes it difficult to burn satisfactorily in a small or thin fire. With a strong fire the drafts have to be watched closely because of the tendency to over-intensity of combustion. In spite of its high heat value and cleanliness in handling, it has therefore fallen short of being a popular domestic fuel.

Another important factor is that, while it has proved quite impracticable to use non-volatile hard coke in locomotives previously using high-volatile bituminous coals, without radical changes in the fireboxes, the indications were that high-volatile coke could be employed for this purpose without material firebox change.

C. M. Garland was retained to revise the designs and supervise the construction and operation of an experimental plant, which was installed at Chicago in 1917. The operation of the plant began early in October and, with some stoppages for corrections indicated by its use, was operated until Dec. 24. Altogether about 140 tons of coal were passed through the plant, about 100 tons of which was Franklin County mine-run crushed to pass through a 2-in. round-hole shaker screen. The other coals tested, in lots ranging from 4 to 12 tons, comprised those from Harrisburg and Eldorado in Saline County, Illinois; Indiana Fourth Vein from the J. K. Dering mine, Clinton, Ind.; Indiana No. 5 from Grant mine No. 4; and Indiana No. 5 from Knox County.

The plant comprised one oven or retort, together with the usual condensing and scrubbing apparatus for the distilled gas, and other necessary machinery and appliances. The oven was horizontal and rectangular, about 30 ft. long, 4 ft. high and 20 in. wide. At each end was a double-door lock, one serving for the admission and the other for the withdrawal of the containers carrying the coal, without admitting any substantial amount of air. These locks were of suitable length to hold one container; they were not heated, nor was a space of the same length as the lock immediately inside of it. The remainder of the retort was supplied with down-draft flues, each of which led to a large off-take flue in the base of the oven, and thence to the stack. The flues were about 1 ft. square in the clear and were laid with ordinary rectangular silica brick. As the volume of clean gas yielded by the low-temperature process is insufficient for heating the oven, provision was made to supply city gas for the additional heat necessary; a commercial plant producer gas would be supplied for this purpose.

A track was laid through the oven with 16-lb. steel rail, 11-in. gage, to carry the containers. These were introduced at intervals into the charging end, each successive container pushing forward those which had preceded it; when the retort was filled, a finished container would be discharged whenever a fresh one was inserted. The train of containers was pushed by a hydraulic ram. They were charged with coal and the coke was discharged from them manually. In a commercial plant the pushing would be done by an electric ram, and the charging and discharging would be mechanical. The container design was the central feature of the process. Those used in this experimental plant

were about 4 ft. long, 4 ft. high and 12 in. wide. Partitions, 12 in. apart, divided each box into four sections, each 12 in. square. Each box was placed on a cast-iron truck mounted on four cast-iron wheels. When the truck and box were removed from the oven, the box was lifted off, the coke discharged, the box replaced on the truck, and returned to the other end of the oven for recharging.

One of the principal purposes of this form of container was to afford means by which the heat could be quickly conveyed through the mass of coal. Experience with the high-temperature byproduct oven has shown that when heat is applied only to the side of the charge, the progress of coking is slow, only ½ in. per hour.

It is impracticable to make a semi-coke of substantially uniform volatile content, unless special means are employed for conveying the heat to the center of the charge more quickly than is possible by means of a heated side-wall only, because if the side-wall temperature is not raised above 1000 deg. F. the progress of the coking toward the center will be prohibitively slow. If the heat is raised above 100 deg. by the time the tarry volatiles are all driven off at the center of the charge, the volatile contents of the coke on the outer

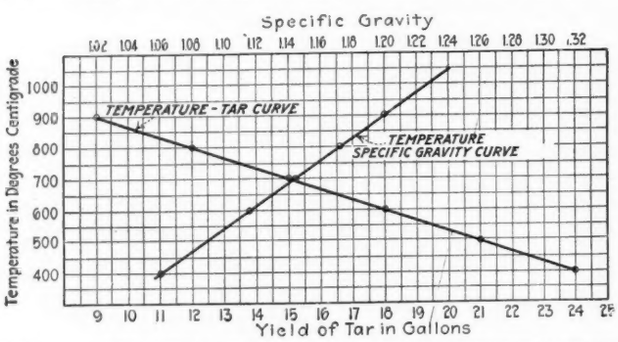

Specific Gravity
1.02 1.04 1.06 1.08 1.10 1.12 1.14 1.16 1.18 1.20 1.22 1.24 1.26 1.28 1.30 1.32
Temperature in Degrees Centigrade
1000
900
800
700
600
500
400
TEMPERATURE - TAR CURVE
TEMPERATURE SPECIFIC GRAVITY CURVE
9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Yield of Tar in Gallons

FIG. 1. RELATION BETWEEN COKING TEMPERATURE AND TAR PRODUCED
Coal contains 30 per cent. volatile matter

side will be greatly reduced, thus giving a coke of widely varying character. Furthermore, the higher temperature will cause a proportionate decrease in the valuable light oils and a corresponding increase in pitch; the percentage of coke also will be decreased. There will be an increase in gas, but it will fall far short of compensating for the losses mentioned.

The first container boxes were made of sheet steel, and were divided into four compartments each 12 in. square. It quickly developed that this column was too large for short-time coking, with a reasonably uniform volatile content. Additional compartments were then put in some of the boxes; while, in others, pipes of varying diameters were placed in the centers of the large compartments. Both of these expedients produced usable coke.

A cast-iron box also was used; the shell and partitions were ¾ in. thick, and the compartments varied from 4 to 8 in. in width. This cast-iron box showed great superiority over all other forms, and proved eminently satisfactory for the purpose. The compartments were tapered slightly, so that by the time the boxes reached the open air the temperature had been reduced enough to cause a slight shrinkage and the coke slipped out of the compartments without difficulty. It showed no tendency whatever to cling to the metal.

The semi-coke thus produced proved a most satisfactory fuel for all general purposes. Although the retort had only side-wall heat, a coke was produced that was practically homogeneous in structure and volatile content. By keeping the charge in the heat long enough, a hard coke with practically no volatile contents could be made; or by withdrawing the charge as soon as it was fused to the center, the coal could be changed into the form of coke while but little of the original volatile contents had been removed.

Experience indicates that the ideal fuel for general use is obtained by leaving about 18 per cent. of the volatile matter in the coke; this gives a satisfactory yield of coke, while, at the same time, practically all the volatile-producing oil or tar has been removed and the coke thereby rendered smokeless. Using compartments of suitable width, the coke is uniform in structure and has sufficient strength to permit sizing and handling. The specific gravity is somewhat less than that of hard coke, but not enough to be a practical objection. The breeze and fines burn satisfactorily, either by themselves or with the coarse sizes; in fact, the behavior in the firebox, in that respect, is quite similar to that of bituminous coal. It ignites readily, the fire is easily controlled and successfully banked for 8 to 10 hours in house furnaces during severe winter weather. It burns with a short, bright, clear blaze, and is clean to handle and fire.

An 8-hour test of the semi-coke made from three different kinds of coal was made on a switch engine in one of the large railroad yards in Chicago. The coals were Franklin County, Illinois, Indiana Vein No. 5 from north of Terre Haute, and Indiana Vein No. 5 from Knox County. In clearing up the pile from which the tender load was taken, all the fine stuff was gathered up with the coarse, so that there was a large percentage of it in the tender load, which, in the proportion of coarse to fine, resembled mine-run coal.

There was a light coal fire in the locomotive and on this the semi-coke was started. This fuel steamed rapidly from the start and made no smoke throughout the test. The amount of cinders thrown from the stack with a heavy exhaust was but a small proportion of the amount coming when using bituminous coal. The semi-coke steamed fast enough to make it unnecessary to use the steam blower when the exhaust was off, as is done to lessen the smoke when bituminous coal is used; this effects a substantial saving of fuel. The engine did its regular yard work for about 4 hours, the crew being changed at the third hour. By this time a thin clinker had formed which, however, was readily removed during the noon hour. Another thin clinker was formed and removed during the afternoon, but some coal, of which there was a small amount at the bottom of the tender, had been fired on top of the semi-coke before this happened.

The engineer of tests of the railroad stated that this clinkering probably resulted from the mixing of semi-coke made from three different kinds of coal, and from the excessive amount of fine stuff. Carl Scholz, who was on the engine during a considerable part of the test, was of the same opinion; and they agreed that the semi-coke had satisfactorily shown its adaptability for locomotive use without material change in the firebox. The semi-coke was entirely new to both firemen.

In regular practice, a semi-coke made from one kind of coal will clinker less than the coal from which it is made. This is because the semi-coke burns without permitting the lumps to break down or melt; there is, therefore, a better circulation of air through the fire bed than with coal. Ordinarily, also, there would be a great deal less fine stuff than was in this tender load. In a plant equipped entirely with casting-boxes, the plant run of semi-coke would contain only a small percentage of fine stuff; from his observation in our experimental plant, Mr. Garland estimates this at less than 10 per cent.

### Volatile Products of Distillation

In the operation of the experimental oven it was demonstrated that it would not be possible to use a brick wall between the side flues and the containers, and at the same time make a practically complete recovery of the oil and gas in the coal. This was partly due to the small amount of gas—½ to 1 cu.ft. per pound of coal—obtained in the low-temperature process, as compared with 5 to 6 cu.ft. in the high-temperature process. A small air leakage, such as exists in the high-temperature ovens, would therefore produce disastrous results. In the experimental oven the use of plain brick instead of special interlocking brick increased the leakage materially, although special precaution was taken in laying up the brick and in coating the interior of the oven with special low-temperature cement.

The quantitative determination of gas and tar was therefore impossible with this oven. These factors, however, have been demonstrated repeatedly, not only by Professor Parr, for practically every coal mined in the State of Illinois, but also by numerous others. The curves of Fig. 1 show the relation between the coking temperature and the tar produced, in gallons per ton, for a coal containing approximately 30 per cent. of volatile matter. These curves are based on experiments made by Lewes, and correspond with the results obtained by Professor Parr. The Illinois and Indiana coals have 35 per cent. or more of volatile hydrocarbons and will therefore produce correspondingly more tar than the 30 per cent. coal illustrated in Fig. 1.

For a commercial oven, a cast-iron retort will be used, which will be lined on the flue side with silica brick. This retort is ribbed to prevent warping, and is fixed only at the center, leaving the ends free to expand. Since the temperature within the oven does not exceed 1000 deg. F., this will not only insure a gas-tight construction, but the retort will be considerably more permanent than a brick structure, and will cost less for maintenance than brick retorts of this form.

The light tar produced by the low-temperature process is a liquid having the consistency of heavy cylinder oil. Its significant characteristics, as disclosed by Professor Parr's work, are: First, the large percentage of the light fraction cut at 210 deg. C. (about 12 per cent.); second, the large percentage of the middle fraction (about 52 per cent.) and the high temperature of the tar acids therein; third, the low proportion of pitch (about 30 per cent. as compared with 56 per cent. or more in the heavy high-temperature tar), the low melting point of this pitch, and its low percentage of free carbon.

Taking Franklin County, Illinois, coal as a basis, the results of operation at the experimental plant indicated that the products of low-temperature distillation will be about 77½ per cent. of semi-coke having 18 per cent. volatile combustible matter, and about 25 gal. of light tar and oil per ton of coal. There will also be a small amount of ammonia, but since the nitrogen in the coal, which is the source of the ammonia, does not leave the coal freely until the temperature is considerably above 1000 deg. F., the greater part of the nitrogen remains in the semi-coke; if this product is then made into producer gas in a byproduct plant, a large recovery of the ammonia may be made. Treated in this way, the recovery from Franklin County coal would be about 100 lb. of sulphate of ammonia per ton of coal.

This assertion is based upon data furnished by C. W. Tozer, of London, England, regarding his experiments with a coal closely resembling that of Franklin County. In the high-temperature non-volatile coke plants, the nitrogen is all driven from the coal but only the lesser part of it is recoverable as ammonia, because the temperature of the oven is so high that the greater part of the nitrogen does not combine with hydrogen, or, if such a combination is made at first, it is later broken up before it can be recovered.

Based upon experience at the experimental plant, the heating period required with the casting containers will not exceed 8 hours, and it is probable that this may be reduced. The length of time required depends upon the greatest distance which it is necessary for the heat to travel through the coal. A shorter period could be attained by reducing this distance, but if it is too greatly shortened, the result might not be compensatory, by reason of structural and other considerations.

### High- vs. Low-Temperature Distillation

Ample data were secured from the operation of this plant, upon which to base enlarged and perfected designs for a commercial plant, and to furnish a sound basis for estimating the cost of installing and operating it. This has been carefully worked out by Mr. Garland and myself, and the results are attractive as to earning power. Such a plant will cost considerably less than a high-temperature plant of the same capacity, and the products will yield a larger return per ton of coal. Franklin County coal, which has a natural moisture content of about 8½ per cent., will yield 12 to 15 per cent. more semi-coke by the low-temperature process than can be derived from it as hard coke by the high-temperature proces. There will be at least double the amount of tar and oil, and commercial investigations indicate that the value of these products per gallon will be several times as great. The high-temperature process will yield several times as much gas as the low-temperature process, but the surplus gas is always sold at a low price. The high-temperature process also has some advantage in the greater amount of ammonia produced, but this is more than offset by other considerations. The opportunities for commercial development of the low-temperature process seem to be great; it is not visionary to predict the substitution of semi-coke, in the central and western states, for a large part of the anthracite and so-called smokeless coals which now come into this territory, by rail or lake.

Many are doubtless well informed as to the large

number of valuable sub-products which may be derived from light tar and oil, and the rapidity with which this chemical industry is now developing in the United States. Dr. David T. Day is authority for the statement that the cracking process for deriving motor fuel from mineral oils has reached a stage of development indicating that it is possible, in this way, to secure nearly 20 gal. of gasoline, or motor fuel of the same value, per ton of Franklin County or similar coal.

## *Who's Who In Coal Mining*

### Clarence W. Watson

Two talents possessed by Clarence W. Watson, of Fairmont, W. Va., Chairman of the Board of Directors of the Consolidation Coal Co., which have contributed materially toward making him a successful coal operator and which have been potent factors in helping him to achieve his position in the business world are his genius for organization and his constructive ability, combined with sound judgment and broad vision.

A man of strong mentality, "C. W.," as he is familiarly known by his associates, has surrounded himself in his

LIEUT.-COL. CLARENCE W. WATSON

various undertakings with men upon whose ability he could rely; and, being an excellent judge of human nature, he has rarely made mistakes in his selections. But the chief factor in the success of this well known builder of industries is his integrity. "His word is as good as his bond." That is the way he is regarded not only throughout West Virginia, but in the financial centers of New York, Baltimore and Richmond; and it is this reputation for integrity and reliability which has enabled him to play such an important part in the development of West Virginia's coal and other resources.

The Government was not slow to recognize how useful a man of Mr. Watson's ability would be in connection with many of the large projects undertaken by the War Department, and his tender of his services was promptly accepted. Commissioned as a Lieutenant Colonel in the Procurement Division of the Ordnance Department, many important tasks were assigned to the West Virginia coal man, among them the Neville Island project of the Government. A few weeks ago Colonel Watson was assigned to service over seas, where his ability as an organizer and executive will be much in demand.

In the short span of fifty-four years, Clarence Watson has with the magic wand of organization transformed many sections of the State of West Virginia from sparsely settled hamlets into thriving, prosperous communities; has linked up cities with a network of interurban railways and has given thousands of men employment in the coal mines he has established in four states.

The youngest of three brothers—all of whom are successful business men—C. E. Watson was educated in the public schools of Fairmont and in the Fairmont Normal School. Of modest demeanor, almost to the point of diffidence, Watson is a man of action rather than of words, a thinker rather than a speaker, traits by which he comes naturally since his father, the late James Otis Watson, was a man of few words. The elder Watson was a sturdy pioneer in the state's development, and that his sons have succeeded in carrying on the development work inaugurated by him is attested to by the Consolidation Coal Co., one of the largest concerns of its kind.

The Consolidation company, as it is well known, is only the outgrowth of the Fairmont Coal Co., which was organized by C. W. Watson, Jere H. Wheelwright and others. Aiding in the formation of the Consolidation company, which acquired mines in four states—West Virginia, Maryland, Kentucky and Pennsylvania—Watson became the head of that great concern and remained as such until his election as a member of the United States Senate in 1911, when he retired as president of the company but was made chairman of the board. Upon his retirement from the Senate in 1913 he devoted much attention to the organization of the Elkhorn Fuel Corporation and other companies for the development of the Kentucky coal fields in conjunction with the late John C. Mayo.

Of late years, outside of his business hours, Clarence Watson has devoted much attention to the raising of fine live stock and finds in that his recreation. It might be said, however, that he derives more unalloyed enjoyment from a good game of baseball than anything else.

At the outbreak of the war in 1914 Mr. Watson was touring Germany with members of his family in an automobile, and the party had many trying experiences. Now in France directing the production of materials and in massing them for the use of the United States and its Allies, it would be strange indeed if through the victory of American arms Colonel Watson were able to again visit Germany, as part of a victorious army.

Largely because of Clarence Watson's ability as a business man and because of a feeling that a man of his caliber was needed in the councils of the nation, not only to aid in dealing with present war problems but with the many questions which will arise in the period of readjustment after the war, the Democrats of the state nominated him as their candidate for United States Senator, although both before and since his nomination he has given his entire time to the Government.

## Would Replace Coal by Peat Fuel

In an address made before the American Peat Society at its annual meeting held in New York City recently, Prof. C. C. Osbon, of the United States Geological Survey, declared that, because of the shortage of coal, the public might be ready to consider seriously the use of peat in the hope that it would prevent a recurrence, in some localities, of the suffering caused by inadequate fuel supplies. He said that the shortage of coal in many European countries since the beginning of the war is being supplied in part by the increased use of this material, and there is no reason why the United States should not utilize its vast deposits of this fuel.

Dr. Osbon spoke on "Peat Possibilities from the Government Viewpoint," confining himself to the uses of peat as fertilizer and fuel. The total quantity of peat marketed in the United States in 1917, the record year in the peat industry, was 97,363 short tons, and the total amount produced since peat was first utilized has been 466,020 tons. In Europe between 15,000,000 and 20,000,000 tons of peat are produced and consumed annually in generating heat and power. In the United States coal, in normal times, is so abundant and, at all times, is so efficient, readily prepared and transported that only small quantities of peat fuel have been produced and the interest shown in the development of the industry has largely been scientific and experimental. However in recent years the increasing cost of producing coal and the failure of the output to keep pace with the ever-expanding demand have led to a general advance in price.

### Use of Peat Would Release Railroad Cars

Professor Osbon declared that the preparation and storage of peat fuel would not only increase the local fuel supply and in many communities prevent a recurrence of the suffering caused by a coal shortage, but it would release railroad cars that are vitally needed for other purposes during the war. It may be used locally in some states during economic and industrial crises, and in some sections, notably New England, it is believed that peat could successfully compete with other fuels for both domestic and industrial use after the war.

He said that the failure in past years in this country to produce peat fuel on a commercial scale was not due to a lack of market, but to the lack of sufficient capital, to the inexperience of operators, to the failure to recognize that peat fuel is inferior to coal, and to preventable engineering errors. Many extravagant claims concerning the fuel value of peat have been made, Professor Osbon declared, but the sooner its inferiority to coal is recognized the better for the peat fuel industry. Over a million dollars have been spent in this country in trying to produce some form of peat fuel equal to coal in heating value, and careful consideration leads him to believe that there are only two forms in which peat fuel can be marketed commercially in the United States. These are as air-dried machine peat blocks and powdered peat.

Air-dried machine peat is suitable for both domestic and industrial purposes. In calorific value a ton of machine peat is equal to about 1.3 tons of wood, 0.5 ton of good bituminous coal and 0.6 ton of anthracite. It is clean to handle and burns freely, yielding an intense heat and producing no soot or other objectionable deposit. For open grates this fuel is nearly ideal. However, the best results for household use could probably be obtained by burning it in a stove with relatively small grate openings and a restricted draft.

For commercial use powdered peat, Professor Osbon said, has many advantages over machine peat as it can be more cheaply prepared and more readily handled. The consumption of peat in a gas producer is perhaps the most effective way of utilizing peat fuel in the generation of heat and power, for peat that is to be used in this way does not need to be so carefully prepared nor so thoroughly dried as peat that is to be consumed for domestic purposes or under steam boilers.

Analyses of the peats of the United States, Professor Osbon said, show that they are rich in available nitrogen, as much as 70 to 85 per cent. of the whole nitrogen content being of that character. The fixed nitrogen in some peats amounts to more than 2 per cent. of their dry weight, and gas-producing byproduct plants operated with peat could recover this nitrogen in the form of ammonium sulphate. The crushed peat is fed into the furnace of a gas producer in which combustion is regulated by steam and hot air. The peat burns at the bottom of the feed shaft, and, reacting upon the steam, forms water gas and ammonia. These gases are next cleansed of tar by means of a scrubber and are subjected to a fine shower of sulphuric acid, which converts the ammonia into ammonium sulphate and purifies the water gas. After being cooled the water gas may be used under steam boilers, in internal-combustion engines, and for other purposes. It is said that in Italy peat containing 2.5 per cent. of combined nitrogen, when treated by this process, yielded 170 lb. of ammonium sulphate per ton.

## Shortage of Coal in New Zealand

There has been a shortage in the coal supply in New Zealand for the past year for two reasons—a decrease in the production of the local mines and also in imports from Australia, according to a recent *Consular Report*. During 1917 the mines produced but 2,068,419 tons as against 2,257,135 tons for 1916, and the imports for 1917 amounted to 597 tons as compared with 293,291,556 tons during 1916, and 518,000 tons during 1914.

The loss in production was largely due to the decreased output of the miners, since in 1916 they produced on an average of 750 tons per miner, while in 1917 they produced but 715 tons per miner. During the first six months of 1918 the combined importations and coal mined in this country amounted to 1,084,719 tons as compared with 1,083,461 tons for the same period in 1917, while stocks on hand on April 30, 1918, amounted to 151,866 tons as compared with 216,987 tons on July 31, 1917. This shortage of coal has had a tendency to slow down some of the industries in the country, and is threatening the railways, street car, and electric-light plants.

Exports from the United States to Latin America in 1918 were ten times as much as in 1898, and three times as much as in 1910, while coffee, cocoa, rubber, hides, copper, wool, nitrates and bananas, the principal articles imported from Latin America, show marked increase in quantities and increased prices since 1914.

# Increasing Coal Mine Efficiency—III

By CHARLES E. STUART
United States Fuel Administration, Washington, D. C.

SYNOPSIS—*A lack of power capacity is often blamed for low voltage at the point of power application. This is seldom the root of the difficulty. Increased voltage may often be secured by connecting together various existing branches of the power line. The mechanical equipment is often in extremely bad condition, and a supposed shortage of power may be rectified by putting engines, boilers and piping in good shape. Electrified mines usually show marked superiority over unelectrified ones.*

## VI—Analysis of Mine Power Conditions in Relationship to Production

FIG. 20 is the resultant of a number of tests at different mines and illustrates in excellent manner the possibility of improving the voltage of the average mine by other means than through the purchase and installation of additional large quantities of copper. The improvement as indicated between curve

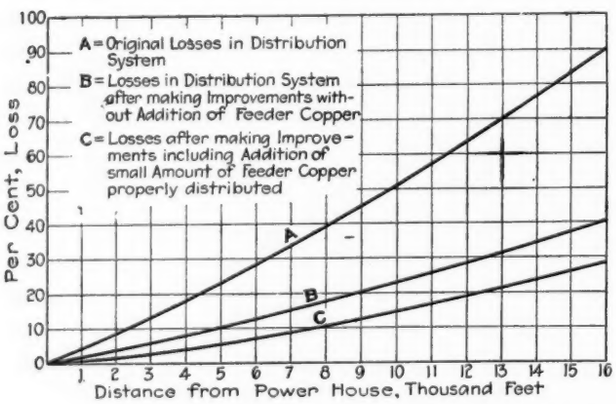

A = Original Losses in Distribution System
B = Losses in Distribution System after making Improvements without Addition of Feeder Copper
C = Losses after making Improvements including Addition of small Amount of Feeder Copper properly distributed
Per Cent. Loss
Distance from Power House, Thousand Feet
A
B
C

FIG. 20. THE POSSIBILITIES OF IMPROVING THE VOLTAGE WITHOUT EXCESSIVE ADDITIONS OF COPPER

*A* and curve *B* has been brought about not only by taking full advantage of all copper already placed, but in addition by improving connections of all kinds. The track bonding was perfected. In a word, conditions as represented by curve *B* were as nearly perfect as practicable without additional copper.

Between curve *B* and curve *C* there is represented an improvement resulting from the installation of feeder copper. A comparatively small amount of copper was necessary to obtain this improvement. That which was applied, however, was so placed as to balance the system and to place good voltage at points where conditions were most severe, rather than carry the copper transmission to those places that are seldom used.

Fig. 21 represents voltage and amperage readings on trips going in and out. The condition of the circuit is well indicated. The test deriving this information is simple and can be readily run by a capable mine electrician with the equipment of instruments which it is criminal negligence for any mine to be without.

The proper application and distribution of copper, while not difficult, is a matter for careful consideration, analysis and test. Fig. 22 indicates the location and capacity of trolley line and feeder copper as well as electrical equipment. Analysis of this layout develops the following simple measures, of such nature as to operate the copper and rail to maximum advantage under the conditions existing.

Referring to this sketch, it would be recommended that both 4-0 wires which connect the substation with point *V* should be carefully connected to both trolleys going into the mine entrance—that is, both the trolley on the empty side and on the loaded side. Points *J* and *H* should be connected with a 4-0 line; *S* and *U* should be connected with a 4-0 line; *D* and *T* should be connected. The following connections should also be made: *P* should be connected with *Q*, *M* with *N*, and *K* with *L*.

In some of the foregoing instances the workings will have to progress a little farther than they are at present, but the advantage of making such connections will be readily seen; and it will be apparent that by means of these connections the utility of the copper now in use throughout the mine will be greatly increased.

As a general proposition a mine does not take full advantage of either its copper or its rail. As a result, copper that is unnecessary is frequently purchased. Conversely, the motors often operate on a lower voltage than is necessary with the copper and rail already installed.

A usual source of power and voltage loss in the average mine is at the bonds. Fig. 23 shows a group of readings taken at random. The record is a good one. The average of a well-bonded track will show a bond resistance of 8 ft. of equivalent rail, and 5 ft. is regarded as an excellent showing. Higher readings may be due to various causes, such as loose terminals and the like. Thus, in the placing of bonds the greatest care should be exercised in order to see that there is no grease or dirt either in the hole or on the bond at the time of insertion. Care should be taken that the fit be tight.

Frequently I have found only one side of the track bonded. More often there is insufficient cross-bonding and almost invariably there are loose terminals. Every fifth rail should be cross-bonded. A loose bond closely approximates a broken connection. Every mine should be equipped with a bond-testing device.

Remember always that the effects of a loose connection, a badly burned switch contact or a grounded wire cannot be overcome by increasing the generating capacity or the installation of additional feeder copper. The parallel of a bad connection is the insertion of a section of ½-in. pipe in a 2-in. line. Do not simply twist a wire connection, but wrap at least 20 turns with No. 10 wire and then solder well. Keep all contacts

of disconnecting switches clean. A corroded or burnt switch, or a contact that is imperfect in any way, is the equivalent of a loose connection.

Extreme low voltage is not necessarily an indication that there is insufficient copper. Such low voltage may occur in entries where the demand is of infrequent occurrence and of short duration. In such cases it would readily become a direct waste of money to attempt to build up the voltage. On the other hand, at those points where the demand is steady, as in the main entries, or where there is a steady pumping, fan or cutting machine load, the voltage should not be allowed to drop below the rated minimum for which the machines were purchased and which minimum is standard with respect to all makes of motors.

It is the rule where there is frequent armature burnout, or in fact where any class of repairs appears an actual loss of power and corresponding wastage of fuel in a greater proportion than the actual voltage drop. Second, in a mine where, for instance, there is a 25 per cent. voltage drop, and where the station appears fully loaded, that this station is actually loaded up, not as a result of the work being done, but because, practically speaking, all over 65 per cent. of the demand represents a direct wastage of energy and a corresponding reduction of capacity. Third, bad power conditions, as stated above, mean frequent burnouts and corresponding repair cost. Fourth, there is further entailed interruption to service with corresponding reduction in output. Fifth, finally, and most important of all, is the reduction in the speed and power of the entire equipment of the mine. This may mean that four pumps are doing the work that three should do, or that four cutting machines are doing the work that should be

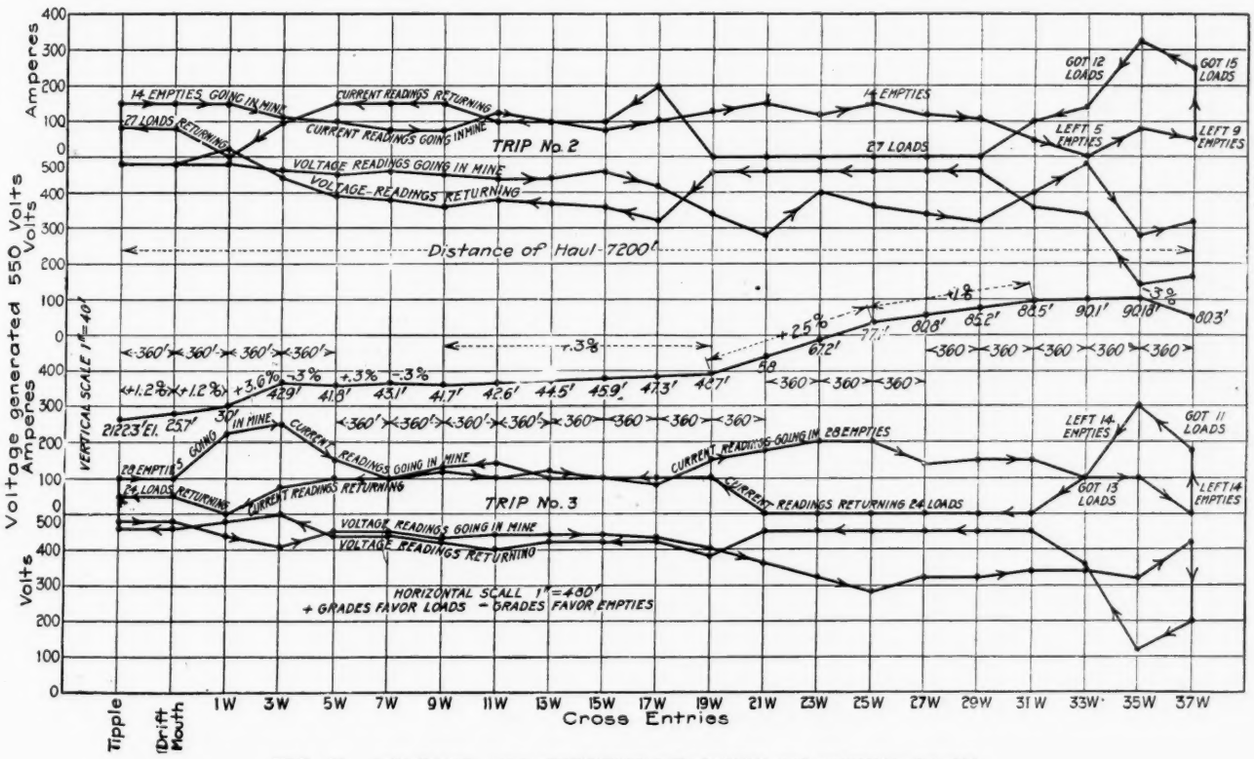



FIG. 21. VOLTAGE AND CURRENT READINGS ON MOVING TRIPS

to be too frequently necessary, to blame or disqualify the equipment. As a matter of fact, in 99 cases out of each 100 the fault does not lie here. Frequent burnout or excessive repair costs of any kind, which should stand out in a properly developed cost sheet, are an indication of neglect of equipment or of equipment operated under unfavorable conditions. If a locomotive is specified as to weight and motors for the load which it is to handle, if the power conditions are approximately those under which the locomotive is purchased to operate, and if the track conditions are reasonably good, the repair cost will rarely attract attention.

But let it be borne in mind that the actual cost of repairs represents only a small portion of the total cost. The interruptions to service, the loss of time while the repair is being made and the demoralization incident to the interruptions are the real considerations.

Bad power conditions mean the following: First. performed by three, or that four locomotives are doing the work of three; in fact, there has often followed an even greater reduction than this in operating efficiency.

## VII—Track Conditions in Relationship to Production

The trackage of a mine and the operating equipment in general may be readily compared with that of a railroad. In fact a parallel may be drawn at nearly every point. It is possible to operate the main haulage system on a rough schedule. The method of picking up cars is identical. The wrecks and interruptions to service arising from badly maintained equipment and other mismanagement that have rendered many railroads unprofitable have likewise thrown many mines into the hands of receivers and prevented other mines from making money.

The excessive grades, which in the case of a railroad cut down train length and necessitate an increase of locomotive power beyond reason, have forced identically similar burdens on the mine operator. Poor roadbeds and badly maintained trackage such as have reduced the running time of railroads and rendered their maintenance excessive, find their parallel in the mine. A well-laid track, rails of proper weight or if this is out of the question at least properly ballasted and

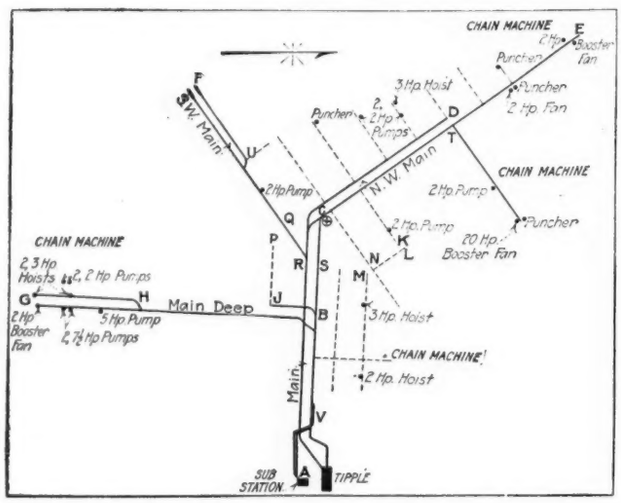



FIG. 22. DIAGRAM OF THE COPPER CONDUCTOR IN A CERTAIN MINE

properly laid, is one of the best investments that a mine owner can make.

In past years it has been the complaint that many of the old Pennsylvania, Ohio and Illinois mines could not be profitably operated on account of the long haul. The deduction is an incorrect one. There hardly exists in this country a mine where the area of development is such as would make the haulage system the determining factor with respect to economical operation.

A properly laid track kept in good repair means an increased production with a decreased cost per ton of coal mined. The reasons for this are clear; however, they may be stated as follows: There results a speeding up of the entire haulage equipment; decreased maintenance cost of locomotives and cars—bumpy track causes rapid deterioration of all rolling stock; wrecks are practically eliminated; rails not properly ballasted or maintained rapidly lose shape not only at the joints, but along the entire length.

## VIII—Condition of Generating Plant

If you generate your own power, what is the condition of your engines and boilers? Will indicating engines derive such a curve as that shown in Fig. 24? I have observed and helped to make many engine tests at mines. Cards such as those shown in Fig. 24 are by no means exceptional.

I recently observed the investigation of a power plant of a mine which in most respects is well operated. Seven 150-hp. boilers were feeding three 200-kw. engine-driven generating sets. Using a high-grade fuel five firemen were having a hard time maintaining 60 lb. of steam pressure. The operator in question proposed to purchase additional boilers and generating equipment. Acting on the advice of an engineer, he decided not to purchase this equipment but to rebore the engines and reset the valves, cover the steam piping and install a feedwater heater. The scale was removed from the boilers, the tubes thoroughly cleaned and the settings repaired. As a result, four of the boilers and two of the generating sets carried the load readily.

This example may appear extreme; but if the manager of the average operation really thinks it is, let him conduct a test at his own plant. There is no great expense attached to such a trial, and I believe that the results in many instances will be amazing.

## IX—Relative Output of Electrified versus Unelectrified Mines

Table V makes a direct comparison between two mines operating in the same coal bed, the one electrically equipped and the other hand-worked. The table shows that the average number of tons produced per day by each man is 3.94 in one case and 2.64 in the other.

TABLE V. COMPARISON BETWEEN AN ELECTRICALLY EQUIPPED AND HAND-WORKED MINE

| | Electrified | Unelectrified | Increase Output Electrified Mine Over Unelectrified | |
|---|---|---|---|---|
| Thickness of seam | 8 ft. | 8 ft. | | |
| Kind of opening | Shaft | Slope | | |
| Method of mining | Machine | Pick | | |
| Kind of machines | Electric | None | | |
| Method of haulage | Mechanical | Mules | | |
| Men employed, total | 402 | 550 | | |
| Miners | 234 | 305 | | |
| Inside men | 108 | 120 | | |
| Outside men | 60 | 125 | | |
| | | | Amount | Per Cent. |
| Yearly output in tons | 485,806 | 450,389 | | |
| Output per miner | 2,092 | 1,476 | 616 | 42 |
| Output per man, total | 1,218 | 819 | 399 | 48 |
| Number of days operating | 308 | 310 | .. | .. |
| Number of tons per man per day (total) | 3.94 | 2.64 | 1.30 | 50 |
| Number of tons per miner per day | 6.79 | 4.7 | 2.09 | 45 |
| Kind of haulage | Electric Locomotive | ..... | .... | .. |

Thus, there is shown a clear gain of 1.3 tons, or 49 per cent., each day by each man in the electrically equipped mine.

Considering the state in which these two mines are located and giving due consideration to the characteristics of the different seams operated, it is estimated that if all the mines now hand-worked were to be

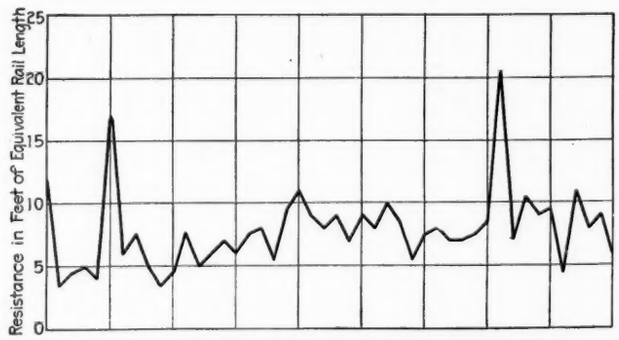



FIG. 23. RANDOM READINGS ON RAIL BONDS

electrically operated, there would be an increase in output of over five million tons; that is to say, the output of the state would be increased by over 25 per cent.

To obtain this increase in output there would be necessary an expenditure of about four million dollars, or approximately 75c. for each ton of increased yearly production. This sum of money in its relationship to the value of the increased production and as measured by the increased requirements of machinery is relatively

small when compared with the cost incident to coal conservation measures which are under way in many sections of the country.

Table VI shows the cost of cutting coal at a certain operation and the estimated cost assuming that electrical equipment were installed. Data gathered since a partial electrification has taken place fully bear out the figures shown. The table is introduced to show the magnitude of the saving made possible through the application of the electric drive.

This table shows that a saving of from 15 to 20c. on each ton produced should be possible when the operation

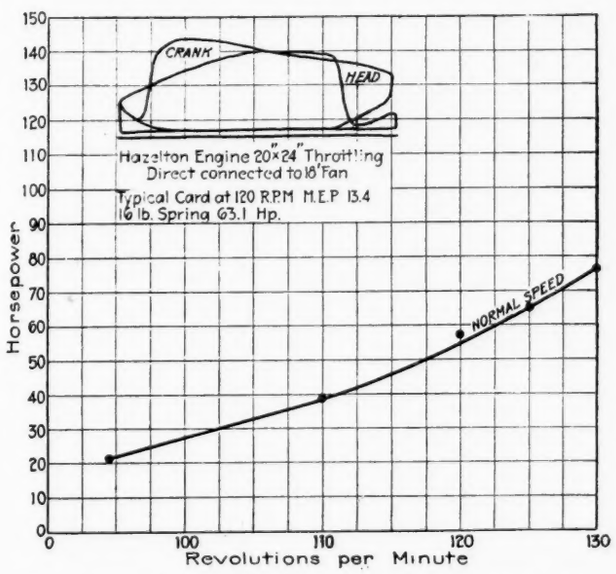



FIG. 24. A NOT EXCEPTIONAL INDICATOR CARD AND POWER CURVE

is completely electrified. In the state where this operation is located, assuming a saving of 15c. per ton, and with a total production from unelectrified mines of 11,000,999 tons, the figure of approximately one year ago, there would accrue a saving in the cost of production in the period of one year of $1,770,000.

These figures, as stated, represent an analysis made

TABLE VI. VARIOUS ITEMS IN PRODUCING COAL UNDER PRESENT UNELECTRIFIED AND UNDER PROPOSED ELECTRIFIED CONDITIONS

| Cost of Cutting Coal | Present | Proposed |
|---|---|---|
| Labor | 17.00c. | 5.70c. |
| Power | 4.93 | 1.12 |
| Total | 21.93c. | 6.82c. |
| **Cost of Haulage** | | |
| Rope | 0.25c. labor | 3.30 |
| Mule | 8.00 power | 1.40 |
| Gas engine | 1.70 hoist | 0.20 |
| Total | 9.95c. | 11.72c. |
| Cost of ventilation | 0.49 | 0.63 |
| Cost of dewatering | 0.10 | 0.08 |
| Cost of screening | 0.19 | 0.17 |
| Cost of washing | 0.58 | 0.27 |
| Total | 33.24c. | 12.87c. |
| **Cost of Pumping** | | |
| River pump | 0.63 | 0.39 |
| Cost of operating gin engine larry and tabby | 0.23 | 0.32 |
| (Not total, but cost affected by change in power) | 34.10c | 13.58c. |
| Saving | ..... | 20.52c. |

in one state. There is, of course, considerable variation in costs in this state and with respect to the different coal beds operated. Relatively, however, the estimates both as to increased production and decreased cost will hold true as between the different beds. They are also valuable when considering operating conditions in other states.

The mines that remain unelectrified are numerous. In the majority of operations, however, competition has forced electrification, even where decreased cost and increased production have not proved a sufficient incentive. The position of the partially electrified mine can be deduced to some extent from the facts given.

*(To be continued)*

## Direct-Current Armature Trouble

BY FRANK HUSKINSON
Trinidad, Colo.

A peculiar case of trouble with a direct-current armature that will be of interest to those having to do with electrical work at the mines, came under my notice recently. The commutator of a 25-hp. direct-current armature was removed for rebuilding. The connections were marked so they could be put back in the same position as they were before. This was a rush job, and the time of testing out the connections was to be eliminated by simply marking the pairs of leads as they were removed from the commutator and then reconnecting them in the same way.

After reconnecting all the leads a bar-to-bar test was made with a milivoltmeter. This test showed all connections O.K. The machine was then assembled and put into service on a pump. The motor seemed to run all right but showed an increase of speed of at least 15 per cent. over what it had run when driving the same pump previously. After running about half an hour, it was noticed that the armature had developed an excessive amount of heat, not confined to any one point but uniform all over the armature and commutator.

Several tests were then made and all connections as well as the voltage were found to be all right. Several trial runs were made, with the same results as before, the armature and commutator heating up excessively. There seemed to be good commutation as there was practically no sparking of the brushes and the commutator had been undercut.

Finally, I decided to remove the armature and give it another bar-to-bar test with the milivoltmeter. The result was the same as before. I thereupon removed all the leads from the commutator and made a rotation test, with the result that at one point I found that the leads had been interchanged so that the top lead of an adjacent commutator bar had been connected with the top lead of the next bar, and the bottom lead of an adjacent commutator bar was connected with the bottom lead of the next bar. This resulted in the windings being split at this point, putting them in series-multiple instead of straight series.

This armature was connected up to operate in a six-pole machine, and the motor was fitted with six brush holders. It was a compound-wound, 220-volt interpole machine. The action of the milivoltmeter in showing all connections O.K. can readily be explained. The current for testing was taken from a bank of lamps in series with only a small portion of the coils on the armature at a time. If the testing current had been used through one-half of the armature at once, it would have shown up this trouble; but the fact that the armature was for a six-pole machine was not even considered.

# Chance Acetylene Safety Lamp*

THE lamp to be described in this article presents many interesting features. Although it is not claimed to have reached the final form for regular mine service, it marks distinct progress. Safety being assumed, the whole question of new lamps turns on the amount of light they will give. As a general indication some figures have been calculated showing that oil lamps will average 7.5, electric lamps 10.7 and the new Chance lamp 37.7 lumens, or about five times the illuminating value of the average oil lamp and 3½ times that of the average electric lamp. This increased lighting capacity will enable the miner to perform his work under conditions conducive to greater efficiency, will tend to reduce the falling of coal and rock, and will undoubtedly lessen the risk of all those accidents which, more or less directly, are the result of ineffective lighting.

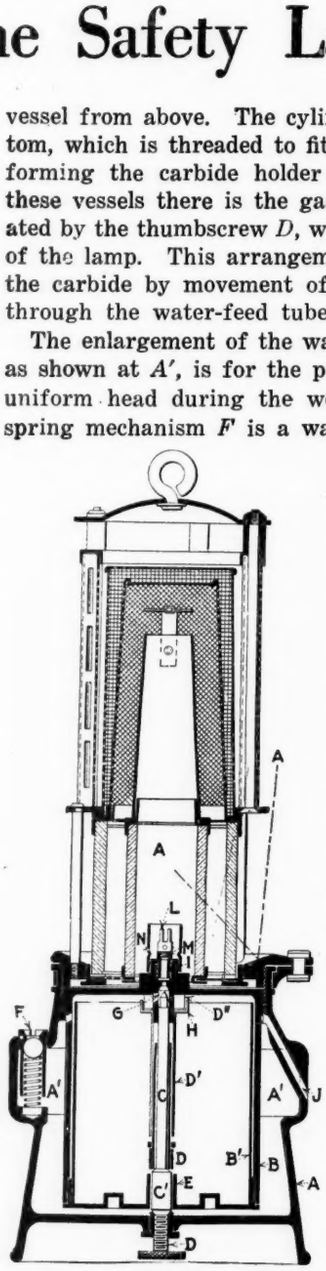
A satisfactory acetylene safety lamp should be strong and so constructed as to withstand considerable rough handling without injury or deformation; be simple as to closure and operation; be compact, without projecting parts liable to damage; be reasonably light in weight; give a better light than any alternative type of lamp; be so designed that it can be inclined or even laid on its side for a few moments, without going out or causing excessive production of gas; be self-regulating, so that once lit the regulation of the flame does not require attention; be convenient to use, well balanced, fitted with suitable handle or hook, and preferably about the same weight and dimensions as the lamps ordinarily in use; be capable of detecting inflammable gas and a deficiency of oxygen and generally comply with the usual official tests for safety lamps; generate gas evenly under all ordinary working conditions; not be a source of danger in itself, either by liberation of a dangerous volume of unconsumed acetylene or through starting methane ignitions through the gauze. The cost of maintenance should lie within reasonable limits, having due regard to the fact that effective lighting is a source of profit both to owners and miners.

## Advantage of Acetylene Safety Lamp

The Chance acetylene lamp, which is a combination of the American type of Wolf lamp with the Mueseler principle adapted to burn acetylene by means of several ingenious advances upon earlier practice, can be used to detect the presence of firedamp in the mine air and to indicate a deficiency of oxygen. It gives increased illumination and is provided with a special reflector which furnishes sufficient illumination of the roof without tilting the lamp, and allows a proper examination to be made. The upper part follows the construction of the ordinary Wolf-Mueseler lamp, with corrugated shield, double gauzes and Mueseler chimney. The novelties of construction are in the design of the generator and in the use of a special form of burner.

Referring to the accompanying drawing, the outer shell *A* (made of cast aluminum alloy) forms the water vessel. The carbide container consists of the inner cylinders *B*, *B'*, the cover *B* being screwed into the water vessel from above. The cylinder *B* is open at the bottom, which is threaded to fit the cylinder *B'* the latter forming the carbide holder proper. Concentric with these vessels there is the gas-regulating valve *C*, operated by the thumbscrew *D*, which is situated at the base of the lamp. This arrangement permits the raking of the carbide by movement of the valve stem *C'* acting through the water-feed tube *E* at the container base.

The enlargement of the water vessel near its middle, as shown at *A'*, is for the purpose of securing a more uniform head during the working of the lamp. The spring mechanism *F* is a water-filling valve. The gas generated by the upward percolation of water through the upper layers of carbide filters through the felt pad *D''* and into the burner tube *I* by way of the side hole *G* in the valve tube. The valve serves to shut off gas or to lower the flame for methane testing. There is no water valve, the gas control being automatic. When the valve is partly closed, the gas pressure increases, thereby pushing back the water into the outer vessel. If the gas pressure is not sufficiently relieved in this way, water is forced out of the lamp by way of the overflow tubes *J*, of which there are two. The brass tube *I*, shown surrounding the valve stem *C*, and resting on the enlargement *C'* at the base of this stem, is intended to prevent carbide from falling into the water-feed tube when the lamp is being charged. During charging this brass tube slips down into the water-feed tube *E*, and is lifted therefrom by the enlargement *C'* on the valve stem to the position shown when the carbide container is assembled in the water vessel.




DETAILS OF THE CHANCE SAFETY LAMP

The lamp is not dependent for safety on the presence of a rubber or fiber washer at any point. The gas is water-sealed with the addition of the mechanical seal formed by the screw thread at the upper end of the carbide container. The Chance lamp combines the use of the Mueseler chimney with that of the double glass safety lamp. It is thus practically two safety lamps in one. The inner glass chimney is virtually spring-supported, so that falls or blows which might break the outer glass have little or no effect on the inner one.

The air feed is from the lower portion of the bonnet

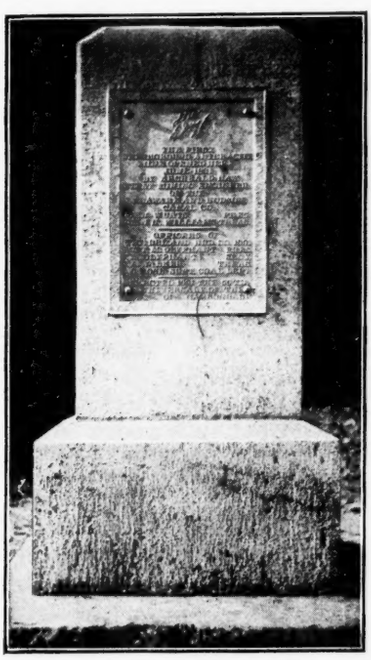
*From a paper by William Maurice presented at the Nottingham (England) meeting of the Institution of Mining Engineers, Sept. 13, 1918.

downward in the annular space between the glasses and through the bottom horizontal gauze to the flame. The weight of the lamp shown is approximately 4 lb. 2 oz. uncharged, and 5 lb. 4 oz. when charged for a 10-hour shift. It requires a charge of from 7½ to 8 oz. of carbide for 10 to 10½ hours burning time. After 4 hours working it is desirable that the water vessel be refilled, which is accomplished through the spring plunger filling hole. Actually the water vessel contains enough water to run a full shift, but during the later hours the gas pressure drops if more water is not added.

The lamp is of the lead rivet locking type with slip ring. The one lock completely secures both the whole of the generator parts and the internal fittings. Points in favor of the Chance lamp appear to be: Increased illumination, availability as a gas detector, facility afforded for roof inspection, reduced risk of extinction, increased safety, absence of perishable joints and portability and absence of deterioration during storage.

## Pioneer Anthracite Mining Engineer

The monument illustrated is a tribute to Archibald Faulkender Law, who was the mining engineer of the first underground anthracite mine. This pioneer operation was opened near Carbondale in June of 1831. Up to that time anthracite had always been obtained by removing the surface; in fact the extensive introduction of stripping in recent years by engineers has been a reversion to the general principles which were accepted almost as final in the earlier days of the industry. According to the record on the stone which was laid in 1901 on the 50th anniversary of the City of Carbondale, Penn., the mine was opened by the Delaware and Hudson Canal Co. The names of John Wurts, president, and John H. Williams, treasurer, appear with those of the officers of the Delaware and Hudson Co., Robert M. Olyphant, president; C. A. Walker, treasurer, and C. C. Rose, superintendent of the coal department.



ERECTED AS A TRIBUTE TO ARCHIBALD F. LAW

Archibald Law was born in Scotland and came to this country in 1830, a year before he opened the Carbondale mine. He came to an extremely sad end. His back was broken in the performance of his duties in the mines and he lingered for five years. The memory of his patience under those years of affliction is still impressed on the minds of his descendants. It may well be said of him that he was bold in enterprise and patient in trial.

## Legal Department

SUBSIDENCE OF SURFACE OF LEASED PREMISES.—When a coal lease purports on its face to state the full agreement of the parties, any invention of the lessor to waive the right to support of the surface must be determined by an interpretation of the written contract, without consideration of any extraneous evidence tending to alter, vary or contradict the terms of the writing. The following clause in a lease does not show any waiver of right to have the surface supported: "Said second party [the lessee] to work and mine said coal in a good, careful and workmanlike manner, and not leave unnecessarily any coal which should be and can be mined with safety to the mine and miner, and said second party shall not be required to work low places or rolls which cannot be mined except at a loss." Under the Kansas statute, which requires suit for damages on account of subsidence of the surface to be brought within two years after the right to sue accrues, the two year period commences to run from the time of subsidence, and not from any earlier date when the removal of coal resulting in the subsidence occurred. (Kansas Supreme Court, Walsh vs. Kansas Fuel Co., 169 Pacific Reporter, 219.)

USE OF CONVICT LABOR IN MINES.—A contract for working defendant's mine by convicts provided that the State of Alabama should have entire control of the convicts, who were to be worked under mine foremen and pitbosses to be selected, controlled, and paid by the state; and that the mines should be worked according to directions given by the defendant's mining engineer. Plaintiff, a convict, while working in one of defendant's mines was injured by fall of rock from a mine roof. Under these circumstances, the supreme court of the state holds in the case of Parker vs. Sloss-Sheffield Steel and Iron Co., 76 Southern Reporter, 924, that defendant's engineer was not charged with any duty to inspect the mine during operation to prevent or remedy dangerous conditions of entries and roofs arising from time to time from the operations of the miners in removing coal; and that the defendant cannot be held liable for injury resulting to plaintiff through failure of the state's bosses to discover a dangerous condition of overhanging rock. Liability could not be predicated on any negligence of the defendant's fireboss, in the absence of proof that it was his duty to make inspections for loose rock or to warn miners of its presence; his duty apparently being limited to inspections to discover the presence of explosive gas, and post or give warnings against its presence, and to look out for proper ventilation.

LESSEE'S RIGHT TO REMOVE MACHINERY—A lease of Arkansas coal land contained a clause providing that the "lessees shall have the right to remove all and any machinery placed upon said lands under this contract upon the termination of same." After the lessees had ceased to operate or pay royalties for several years, and had apparently abandoned the lease, the plant was badly damaged by fire. Later the lessors sued to cancel the lease and on cancellation being decreed granted a new lease to a coal company, which took possession of the premises and plant and repaired the machinery. No attempt on the part of the original lessees to recover the machinery was taken for several months after cancellation of the lease. Under these circumstances, the Arkansas Supreme Court holds that the original lessees forfeited all claim to the machinery, saying: "The original lease provided that the lessee might remove the machinery upon the termination of the lease. This did not mean upon the exact moment the lease was terminated, but it did mean that the property should be removed within a reasonable time after the termination of the lease. The facts in this case disclosed that they waited an unreasonable time, and, during that time, permitted the original owners and its lessees to place repairs on the property greater in value than the original property itself." (Heim vs. Brock, 202 Southwestern Reporter, 36.)

## Work Sundays to Make Up Tonnage Loss

To offset loss of tonnage more than 70,000 miners in the central Pennsylvania district have agreed to work Sundays in order to keep up production during the epidemic of influenza. Charles O'Neill, the district production manager, reports that some fields have been very seriously hit by the epidemic. Some mines have been forced to close entirely for several days at a time. By working extra hours and on Sunday, it is believed that a considerable portion of the loss will be made up.

"For the week ended Sept. 28, central Pennsylvania produced 1,306,408 tons," says Mr. O'Neill in a report to the Fuel Administration. "Since then we have been losing tonnage, owing to the influenza epidemic. For the week ending Oct. 5, we produced 1,203,942 tons, or a loss of 102,466 tons, compared with the previous week; for the week ending Oct. 12, we produced 1,234,337 tons, or a loss of 72,071 tons, compared with the week of Sept. 28, making a total shortage of 174,337 tons to Oct. 12. The week ending Oct. 19 will show a greater loss."

More than one-tenth of the miners in the Pocahontas district are suffering from influenza, according to R. D. Patterson, the production manager, who has reported to the Fuel Administration for the week ended Oct. 19. He also reports the disease is raging among the employees of the coal-carrying railroads. In addition to the miners, themselves, who are ill, many are kept from work due to cases of influenza in their families.

## Middle West Car Situation Satisfactory Says Regional Director Holden

Performance of the railroads in coal loading in the Middle West is all that could be asked, Hale Holden, the regional director for that section, says in a report which follows:

The coal situation in Illinois and Indiana during the month of September was more satisfactory in point of car supply than during the month of August, but much less satisfactory from a production standpoint, as indicated by the following figures, which cover loading in the central zone, or district, and are little more in excess of the actual coal loading in the central western region:

| | August | September |
|---|---|---|
| Cars loaded, 1918 | 184,235 | 172,585 |
| Cars loaded, 1917 | 150,940 | 146,302 |
| Increase over previous year | 33,293 (22%) | 26,283 (18%) |

It will be noted less cars were loaded in September than during the previous month due to mines not working Labor Day and many mines being down on the 18-45 registration day, and for the primary a few days later. Conversely, these holidays enabled the railroads to make a better showing as to car supply.

Even with the decreasing loading the Fuel Administration has been pressed to provide markets, and has only been able to do so by arranging for the sale of coal to railroads for movement beyond the normal commercial zone. In order to continue the ratio of increased loading over last year, particularly in Illinois, the Fuel Administration gave consideration the latter part of September to the established zone lines. As a result, the present summer zone line through Wisconsin and Minnesota will be continued as a winter line on all prepared sizes and mine-run. The lower peninsula of Michigan will be held open all winter for Indiana, all grades, and for Illinois screenings.

The accumulation of coal on track in the Chicago district is growing less and is practically down to normal. The state and Cook County organizations of the Fuel Administration have taken hold of the situation vigorously and will undertake to force unloading.

Taking it as a whole, the performance of the railroads during the month of September in this territory in coal loading was all that could be asked by the Fuel Administration. There is the closest coöperation between the railroad officers and the Fuel Administration, and the general organization is working harmoniously and to the best interests. Reports for the five months since April indicate that the commercial coal requirements for Illinois consumption were 48,360 cars per month, or a total of 241,800 cars. We have loaded and handled 290,330, an excess over the requirements of the Fuel Administration of 48,450 cars, or 17 per cent. Figures for September not yet available in detail indicate a still further excess over the requirements.

## Treasury Department to Facilitate Handling of Taxes from Mining Companies

With the idea of facilitating the handling of taxes on mining properties, a separate division is to be formed in the Treasury Department. Examiners who are specialists in mining taxation will handle the returns from mining companies. Heretofore, returns from mining companies have given a great deal of trouble, much of which is thought to be due to lack of knowledge of the mining business on the part of examiners. The new plan will be resorted to in an effort to improve that situation.

## What One Ton of Coal Will Do

In order that it may be easier to visualize the value of a ton of coal, the Fuel Administration has compiled a number of equivalents. For instance, one ton of coal will make 20,000 cartridges, or 400 bayonets, or 250 helmets, or one-fourth of a ton of steel. It will generate 200 kw.-hr. of electricity. It will carry 15,000 soldiers in one ship two miles at sea. It will move 50 freight cars 50 miles. It will build two tons of shipping. It will make 1400 lb. of coke and the following by-

products: 6200 cu.ft. of gas; 23 lb. of ammonium sulphate; 6 gal. of tar; 2 gal. of benzol; four-tenths of a gallon of toluol, in addition to many drugs, disinfectants and other chemicals. The materials can be gathered and an 8000-ton ship built with 9760 tons of coal. On the other hand, it does not last long when converted into shells being fired against the Germans. In the seven months' defense of Verdun, the French fired 60,000,000 shells, containing 1,800,000 tons of steel. The manufacture and transportation of these shells called for 9,000,000 tons of coal.

## Fuel Administration Speakers Urge Large Production on Patriotic Grounds

While the epidemic of influenza has interfered importantly with the plans for stimulating coal production, the Fuel Administration has not called in its speakers. These men, instead of addressing audiences, are spending their time mixing with the men in order to put into circulation the thoughts which otherwise would have reached them from rostrums.

The message which these speakers carry is based on patriotism. The man is urged on patriotic grounds only to make his maximum endeavor. No appeal is based on the incidental fact that his earnings will be increased. No opportunity is lost to point out that six days' full time work every week is the best way a coal miner can back up his comrades at the front.

## Holland to Get American Coal

Holland will begin again to take coal from the United States in the near future, it is believed. The War Trade Board has offered to supply her 100,000 tons of coal a month, if she will come for it. If the full amount is taken, however, it will not interfere with the coal budget, which provides 6,000,000 tons for export.

Holland will pay the mine price plus the bunker surcharge and the freight. This will represent a tremendous saving over the price of $36.18, plus a commercial credit of $12.06, which Holland must pay for each ton of German coal. The clearing of the Belgian coast so reduces the danger from submarines to Dutch shipping that it is expected Holland will take its full quota of American coal in the future.

## Coal Loading Shows Decrease

Coal loading on railroad cars for the week ended Oct. 19, together with the figures for the corresponding week of 1917, according to the Railroad Administration are as follows:

| | 1918 | 1917 |
|---|---|---|
| Total cars bituminous | 195,143 | 171,041 |
| Total cars anthracite | 33,603 | 41,277 |
| Total cars lignite | 3,610 | 3,976 |
| Grand total cars all coal | 232,356 | 216,294 |

Increase of 1918 up to and including week ending Oct. 19 over same period of 1917 ..... 730,203 cars

The number of cars loaded with bituminous coal at all mines throughout the country during the week of Oct. 19 showed a decrease compared with the previous week, amounting to 7 per cent. The falling off occurred mostly in the territory east of the Mississippi, and apparently is a direct result of the epidemic of influenza which has been existent in that territory for some time, and seems to have reached the mining regions to an extent sufficient to affect coal loading during the week of the 19th and to a lesser extent during the previous week.

On those roads where the coal loading fell off more than 5 per cent., it was quite usually the fact that the orders for empty cars placed by the mines also fell off to the same extent or greater. The mines were not, however, able to load even up to their expectations, as evidenced by their car orders, a fact which is demonstrated by an extraordinary increase in the number of empty cars left standing over at these mines unloaded from day to day during the week.

The information concerning loading for the succeeding week of the 26th would seem to indicate that conditions have not improved in the coal-loading territory, and a further decline in production must be expected during the week ending Oct. 26.

## American Coal Exports in August

Exports of coal, as reported by the Department of Commerce, for August, 1918, and the figures for August, 1917, as finally revised, are as follows:

| Coal | August, 1917 | August, 1918 |
|---|---|---|
| Anthracite | 678,797 | 411,804 |
| Bituminous | 3,051,628 | 2,222,187 |
| Exported to: | | |
| Italy | 41,519 | None |
| Canada | 2,424,668 | 1,959,017 |
| Panama | 72,274 | 52,831 |
| Mexico | 10,389 | 13,082 |
| Cuba | 217,524 | 105,408 |
| Other West Indies | 19,373 | 12,367 |
| Argentina | 35,229 | None |
| Brazil | 132,898 | 46,877 |
| Chile | None | 22,720 |
| Uruguay | 9,971 | 7,245 |
| Other countries | 87,783 | 2,640 |
| Coke | 107,978 | 131,751 |

## Retail Prices of Hard and Soft Coal

Retail prices of anthracite and bituminous coal in the principal cities of the country have been ascertained by the Bureau of Labor Statistics of the Department of Labor. The figures for some of the more representative places are as follows:

| | January, 1913 | January, 1918 | July, 1913 | July, 1918 |
|---|---|---|---|---|
| Baltimore (2,240 lb.): | | | | |
| Pennsylvania anthracite—Stove | $7.70 | $9.60 | $7.24 | $10.45 |
| Pennsylvania anthracite—Chestnut | 7.93 | 9.75 | 7.49 | 10.55 |
| Boston: | | | | |
| Pennsylvania anthracite—Stove | 8.25 | 9.85 | 7.50 | 10.25 |
| Pennsylvania anthracite—Chestnut | 8.25 | 9.85 | 7.75 | 10.25 |
| Chicago: | | | | |
| Pennsylvania anthracite—Stove | 8.00 | 10.35 | 7.80 | 10.90 |
| Pennsylvania anthracite—Chestnut | 8.25 | 10.39 | 8.05 | 10.98 |
| Bituminous | 4.97 | 6.67 | 4.65 | 6.48 |
| Cincinnati: | | | | |
| Pennsylvania anthracite—Stove | 8.25 | 9.50 | 7.50 | 11.66 |
| Pennsylvania anthracite—Chestnut | 8.75 | 9.50 | 7.75 | ..... |
| Bituminous | 3.50 | 6.10 | 3.38 | 6.73 |
| Detroit: | | | | |
| Pennsylvania anthracite—Stove | 8.00 | 9.88 | 7.45 | 10.15 |
| Pennsylvania anthracite—Chestnut | 8.25 | 10.08 | 7.65 | 10.52 |
| Bituminous | 5.20 | 8.27 | 5.20 | 8.18 |
| New York: | | | | |
| Pennsylvania anthracite—Stove | 7.07 | 9.06 | 6.66 | 9.30 |
| Pennsylvania anthracite—Chestnut | 7.14 | 9.08 | 6.80 | 9.29 |
| Philadelphia (2,240 lb.): | | | | |
| Pennsylvania anthracite—Stove | 7.16 | 9.59 | 6.89 | 9.81 |
| Pennsylvania anthracite—Chestnut | 7.38 | 9.68 | 7.14 | 9.89 |
| St. Louis: | | | | |
| Pennsylvania anthracite—Stove | 8.44 | 10.43 | 7.74 | 11.00 |
| Pennsylvania anthracite—Chestnut | 8.68 | 10.53 | 7.99 | 11.25 |
| Bituminous | 3.36 | 5.44 | 3.04 | 5.89 |
| San Francisco: | | | | |
| Bituminous | 12.00 | 13.87 | 12.00 | 14.08 |
| Seattle (Zone A): | | | | |
| Bituminous | 7.13 | 7.87 | 7.20 | 9.13 |
| Washington (2,240 lb.): | | | | |
| Pennsylvania anthracite—Stove | 7.50 | 10.10 | 7.38 | 9.96 |
| Pennsylvania anthracite—Chestnut | 7.65 | 10.19 | 7.53 | 10.06 |

# THE LABOR SITUATION

EDITED BY R. DAWSON HALL

## General Labor Review

The anthracite settlement has gone one step forward for it has been approved by the Conference of National Labor-Adjusting Agencies, which Conference adopts the regulation defense of the wage increase; namely, that it is necessary to prevent a depletion of mine labor and to avoid dissatisfaction. It declares that the wage scale is given for these reasons only, the mine workers having loyally stood by their contract.

A contract rightfully should require the man accepting it not to leave for other industries while under the contract. The ethics of this matter has never been worked to a finality and perhaps should not be pressed at this time. Furthermore, a dissatisfaction with a contract, such as is here alleged, has not been held in the past a good reason for its discontinuance or revision. As for the contract having been lived up to, that is true of a majority of the men. A large minority, however, has struck frequently to force the hands of the authorities.

### OLD ANTHRACITE CONTRACT NONE TOO GENEROUS

As a matter of fact the main reason for a change in the contract, namely that the old contract was none too generous, is only implicitly embodied in the statement of the Conference. It seemed reasonable to the labor-adjusting agencies that in view of the high cost of living and the improved status of those engaged in war industries, a better wage should be paid. It is therefore to be granted. It is to be feared that it will do little to reduce labor depletion, and there is a serious danger of its causing difficulty in the bituminous regions, where an increase is expected every time the anthracite region is granted one. Usually the bituminous region has been forehanded and secured its increase first.

Dr. Garfield has refused to consider the demand of the bituminous mine workers, at least at the present time. There is no argument justifying any increase in wage in the bituminous coal industry. The anthracite mine workers said the high wages of bituminous mine workers made an increase in anthracite wages essential. Now the bituminous mine workers say that the increase of the wages of the anthracite mine workers justifies the highly paid bituminous mine workers in seeking a proportionate wage increase.

### PLAN TO REVIVE INEQUITABLE DIFFERENTIAL

To concede what they ask would be to reëstablish the differential in all its pristine inequity, and thus give the anthracite mine workers an excuse for more dissatisfaction and a further increase.

Dr. Garfield is to be congratulated on his decision. His patience with the anthracite claimants was excusable, but patience with the bituminous mine worker would be without excuse. The public is not ready to pay these men an outrageous price for their labors. The Government is little disposed to make the workingmen of America pay any larger wages to these workingmen than it is paying at present.

It is not willing to let a few men in key jobs make the workingmen in less strategic jobs sweat for them. The bituminous coal miner has been squealing about the cost of living, but he has been one of the most persistent boosters of living cost. He is like the man in the crowd, who roughly elbowing his way to the front, angrily demands of the bystanders that they "quit shoving."

It has been estimated that the influenza epidemic has cut the output of anthracite coal between 1,000,000 and 1,200,000 tons a month. When there is sickness, the mines become disorganized. Some who would work are not given the opportunity, and there is general dissatisfaction with the slower run. Moreover, many who come to work are rendered listless either by reason of their own sickness, the sickness of others or fears for themselves. Funerals also occur, keeping men from work. In some places the grave diggers could not perform the large amount of work demanded, and mine workers had to provide for the interment of their own relatives and friends.

### SOME GREENSBURGERS WHO ARE WORKERS

The Fuel Administration has published an interesting account of the performance of the men working for the New Alexandria Coke Co. at Andrico, not far from Greensburg in central Pennsylvania, a mine operated under the supervision of C. L. Clark, a man whom all the members of the Coal Mining Institute of America remember with affectionate good will and whose success is as much due to his amiable personality as to ability as a mining man. Forty-eight men, or 38.3 per cent of the working organization at his mine won honor distinctions for full-time service during July, August and September. Each man worked 78 days during the three months, and the individual tonnage of the 48 men averaged 17 tons a day.

A big celebration will be held at the New Alexandria works this week and personal letters of congratulation and appreciation will be presented the honor roll workers. These letters have been addressed to the men by J. B. Neale, production manager of the United States Fuel Administration. James S. Amend, district production manager, will present the letters and will personally commend each worker for his loyal and patriotic service.

Records of the New Alexandria Coke Co. show it carried an average of 128 men on its pay roll during the three months. Of the forty-eight workers on the honor list 22 are Austrians, 14 Americans and 12 Italians. Each man who retains a record of 100 per cent service during October will receive an industrial service flag. These flags will be displayed by the miners in their homes and will serve as a badge of loyal war-time service.

### AUSTRIAN DUG AND LOADED 323 TONS EACH MONTH

Frank Corent, an Austrian, made the high production record at the New Alexandria. In three months his output totalled 1615 tons. It does one good to commend these New Alexandrians who come from lands with which we are at war and who so admirably sustain us in our efforts. Their loyalty shows that they appreciate America. We could ill afford to intern such men. Good judgment has been shown by the administration in exhibiting resentment toward the subjects of enemy alien countries and toward naturalized citizens from those countries only when they exhibit by their lack of service or by outspoken attacks on the United States a lack of respect for the country of their residence. There are many men among these enemy alien residents who are doubly loyal, loyal for what they have sworn, and loyal again for what they have foresworn.

The miners in central Pennsylvania worked quite generally on Sunday, Oct. 20, to make up for the loss of tonnage due to the influenza, and at last reports were preparing to work again on Sunday, Oct. 27. They are determined to fill their weekly quota whether sickness intervenes or not. As the soldiers are forced to fight on Sunday, the industrial soldiers are backing them by working on that day. It is much to be regretted that such a sacrifice is necessary.

The Spanish influenza still rages in West Virginia. It has not abated to any appreciable extent and few are the coal districts that have escaped it. In the Pocahontas and Tug River districts there are 2100 cases of the epidemic and only 8000 miners are left to maintain the production.

In the New River district a large number of cases are reported, especially in the Loop Creek section and along

the main line of the Chesapeake & Ohio Ry. The production has accordingly been much reduced. The Kanawha and Fairmont districts have also suffered severely. The West Virginia coal association has thought the situation serious enough to put out a general bulletin on the subject.

The question of who is responsible for curtailed coal production has been brought up by the miners in Local No. 1421 at Buckner, Ill., in the form of a resolution which was adopted at a meeting a few nights ago. It declares that, although the Buckner mine was sunk and developed to have a capacity of 4000 tons a day, as much as 5040 tons have been hoisted in a single day, but under existing conditions it is turning out only 2853 tons daily. The reason, it is declared, is lack of cars and underground equipyment. The resolution states that one crew stayed in the mine 6 hours one day and 4 hours on each of three days of last month, and was given only two or three mine cars to fill. A St. Louis newspaper man who made inquiry at the request of the Buckner local found similar complaints at other mines, except at Mines No. 1 and No. 2, of the St. Louis & O'Fallon Coal Co.

Five hundred miners employed at the Security Coal and Mining Co.'s mine at Duquoin, Ill., refused to go to work on Oct. 23 because the Illinois Central R.R. did not provide suitable equipment to convey them to the mines.

There appears to be no finality to the demands of British Columbia mine workers. In the past year and a half, or two years, the wages of coal miners in British Columbia, roughly speaking, have risen 45 per cent., in addition to a 50-cents-a-day war bonus. In other words a man who was receiving $3.65 a day in wages now is getting $5.79 or, if he works an average of 30 days in the month, which most of the overmen do, he gets approximately $174.00 a month. But this is a small wage compared to what some of the best coal miners are making. Yet, on the other hand, it is much more than the wage paid to some of the coal mine inspectors.

The continued advance in living costs, however, has resulted, according to authoritative report, in the decision by the miners to request a further increase and it is understood that they have forwarded to the proper quarters a request that the scale be boosted a further $1 a day. It remains to be seen whether the Fuel Controller will find that this is justified by present living conditions in comparison with those who existed at the time the last raise was allowed. If the men are supported it will mean, no doubt, corresponding addition to the selling price of coal, which went up only a short time ago despite the protests of an indignant public.

## Labor-Adjusters Approve Wage Contract

The Conference of National Labor-Adjusting Agencies has authorized the following statement:

"Since the beginning of the war the number of mine workers in the anthracite coal fields has decreased from 180,000 to 144,000, and, under existing conditions, a further depletion, which will seriously affect the output of coal, seems to be inevitable.

"An anthracite wage agreement was entered into last December [November?] by the operators and mine workers, a pledge being made at the time to the Fuel Administration that the contract should continue in force for the duration of the war; but events have made a continued performance of the obligation a real hardship to the mine workers. Yet in spite of this fact the mine workers and operators have adhered to their undertaking and have patiently exerted their energy in order to maintain the required output of coal. They regard the obligation as binding whatever hardships it may entail on them.

"But other considerations than the contract made by the men are involved; for time has revealed conditions that were not anticipated last winter. There has been a movement of men away from the mines to other war industries and a growing feeling of restlessness among the men at the mines. To continue the arrangement of last winter without any readjustment is to disregard a situation that threatens to interfere with the successful prosecution of the war.

"Therefore, in order to ascertain all the facts and to find a remedy for the situation, representative anthracite operators and mine workers have been meeting, in accordance with your [the Department of Labor's] suggestion, with Dr. Garfield and representatives of the Fuel Administration. They have thoroughly considered the figures available in regard to the increase that has occurred in the cost of living since last winter, the relations between wages in the anthracite and bituminous fields, and between anthracite and other war industries.

"As a result of these studies and deliberations, a plan of adjustment designed to check depletion and unrest in the anthracite coal fields has been submitted to this conference for our independent judgment and recommendation in view of the labor situation of the entire country. After careful study of the suggested plan of readjustment and the grounds upon which it is based, we are convinced that the interest of the whole nation compels this readjustment.

### Wage Rate From $3.36 To $6.60 per Day

"We, therefore, recommend the readjustment of the anthracite wage scale, as provided in the plan submitted to us, which establishes, in substance, a scale of wages ranging from 42c. per hour for laborers outside of the mine to average earnings for contract miners approximately estimated at $6.60 per day. This scale we have found to be in line with the wages already established by governmental agencies for other industries, and we are convinced that its adoption will act as a stabilizing influence. Without such a readjustment, the vital coal needs of the country are jeopardized. With such readjustment, there should be no further drains on the labor force of the anthracite mines and production should be maintained and, probably, increased.

"Before reaching the conclusion that the readjustment we herein recommend is necessary to meet the national situation, we satisfied ourselves that in no other way can the necessary supply of labor be maintained or stability in the industry be assured. Prior to the European war, labor in the coal fields was largely recruited through immigration. Since 1914 this flow has entirely ceased. Therefore, especially in view of the increased coal need of the country, it is essential that the anthracite industry retain the labor resident in that region.

"The mine workers are fully alive to the country's need for production, and their organizations have carried on an intensive campaign to stimulate output. The efficiency of the workers is attested by the fact that, although there are 36,000 less to do the work now than there were before the war began, the production of coal has been maintained. It is gratifying to know that the mine workers have generously undertaken, for the period of the war, to continue steadily at work even though the observance of religious and other holidays has to be foregone.

### Unascertained Factors in Labor Situation

"One matter was made clear in our meetings and we deem it pertinent for the consideration of the Fuel Administration. It appears that there is no scientific knowledge in regard to some of the underlying facts of the anthracite industry, though upon these facts all decisions as to wages and output should ultimately be based.

"Representatives of both mine workers and operators have urged upon us that steps should, at once, be taken so that systematic and authoritative information will be obtainable in the future, in regard to such fundamental questions as comparative earnings, labor turnover, continuity of employment and sufficiency of output. It was agreed that we must create conditions which will assure greater continuity of employment, greater regularity of work, greater quantity of output and that at the same time every safeguard must be provided that will protect the workers in this hazardous industry.

"In a word, the conditions of the industry must be stabilized. Therefore, the attitude of mind of those in the industry in regard to those conditions must be organized. As a necessary prerequisite we must have that basis of knowledge upon which alone we can act wisely and with justice."

# EDITORIALS

## Peace Without Victory

WE WANT peace because we did not enter the war from any pleasure in fighting. We do not keenly desire victory, for it was not a thirst for glory that made us take up arms. We have no purpose in this war but justice—justice especially for Germany.

And by justice we do not mean that right of "life, liberty and the pursuit of happiness" which the Declaration of Independence, written for well-intentioned people and intended for their governance, said was the right of all the well-intentioned. We, here in America, deny and have long denied the unrestricted rights of "life, liberty and the pursuit of happiness" to such men as are guilty of criminal actions. We do not give them the justice of the well-intentioned, but instead what is known as retributive justice.

That is the justice which for the present we desire for Germany. We seek for an unconditional surrender. If Lincoln was in any way justified in leaving the issue of peace and war to Grant, if Grant was in any measure justified in demanding "unconditional surrender," surely Wilson is today justified in leaving the terms of surrender to Foch; and Foch is authorized by all the dictates of conscience in requiring that the enemy shall admit itself beaten and without any defense but a plea for mercy. What was forced on the knightly Robert E. Lee should be demanded of the unnamed successor or successors of the bestial Ludendorff.

When the sheriff goes to get his man, does he argue with him? Does he promise him just what the jury shall decide as to his guilt? Does he announce to him what the judge shall award him as his deserts? If he did, the sheriff would be considered as violating the law and overstepping the measured limits of his domain. He catches him first, and the law tries him later. He is not suffered to compromise the court.

Of course, the judging and the apprehension of international offenders have not been by law circumscribed, so that we can say the chiefs of the armies and navies may not discuss terms with the offender; but in this case, at least, it would seem well to ask them to avoid doing so. We do not want the administration of justice to be hindered in any way by an agreement that may be used by the ruffianly Hun in such a manner that we may be adjudged as compounding with his villainy.

## Economic Losses Arising from High-Ash Coal

DURING the past year or so much complaint has been heard concerning the large amount of slate and bone in the coal shipped by some operating companies. Although much improvement has been made in the matter of clean coal, there is still much room for betterment. Both in transportation and consumption dirty coal entails needless waste and loss.

Of course, the logical place to rid coal of its objectionable impurities is before these impurities have had an opportunity to begin their work; that is, objectionable impurities should never be allowed to travel farther or in any other direction than form the coal face to the gob, a few feet away. Once bone or slate enters a mine car it begins to be a drag and a drain upon transportation, and it never ceases its bad work until it lands upon the ash heap of the ultimate consumer. The farther it travels the more harm it does. The trip from face to gob is the shortest journey possible and consequently the least expensive.

When a coal bed contains high-ash impurity and the miner is paid by the ton, when the cry is constantly for coal and more coal, when miners are scarce, the union vindictive and employers can ill afford to "fire" anyone, the temptation to load out everything that comes down is ever-present. To some it is apparently irresistible. The loader who succumbs to this temptation certainly does not realize the effects of his iniquity. He sees only a chance to clean up his place a few minutes quicker or possibly get out an extra car of coal before quitting time. He does not realize that in loading out bone and slate and similar impurities he is "giving aid and comfort to the enemy."

American miners as a class are unquestionably patriotic. Should you search the country over from Tamaqua to Issaquah it would be difficult to find one who would willfully do aught to aid the Kaiser or any of his infamous brood. None would knowingly or wittingly harbor an enemy agent or spy within his gates—he would like nothing better than the chance to turn such a person over to the proper authorities. The enemy agent is in this country—figuratively speaking—to throw sledge hammers into the gear wheels of American industry. The miner who loads out dirty coal accomplishes this same result. He could scarcely perfrom a greater service for the Hun were he actually in the Kaiser's pay.

## Will the Enemy Alien Return?

AFTER the war the enemy aliens are quite likely to return to Europe, those who are favorably disposed toward America as well as those who are not. The best and the worst will go back—the best because their hearts are the largest and they will want to return to restore those they left behind them, and the worst because this country never appealed to them.

It is a question, however, just what will happen to the men who go back. As they are citizens of foreign countries they may be held, and their earnings may be sequestrated in the land of their birth. No great regard will be felt for the sanctity of such property as they have secured by working in the mines of a nation with which their natal country was at war. It is not likely that Germany or Austria will be kindly disposed toward those who thus return. Moreover, their very leaving of their native land was in many cases a violation of the law, for which they may be punished.

It would be a kindness to such men to warn them about the dangers of a return. Their best interest would be served by prudently waiting till they discover just what happens to those who first venture to go home. It is by no means certain that they will not regret the rashness that led them to return to the lands from which they came.

Should there be a military occupation of those countries, perhaps it might be safe to revisit them. But if a revolution occurs, a visit may be anything but prudent; for the United States will not protect aliens, its ægis being held over only its own citizens. It would seem that few would be disposed to leave their jobs and risk their earnings if they only knew that some one would find their loved ones, report their condition faithfully and take charge of the money to be given toward their reëstablishment.

The Red Cross could perform this service for enemy alien laborers in this country, perhaps at a small charge. In fact it could do it better than the emigrant, should he return to do it himself, and meanwhile he would be earning good American wages.

It appears likely that by pointing out the dangers of a return and by providing the emigrant with a means for caring for his family without returning home, most of the enemy alien mine workers would willingly retain residence in America and become desirable citizens. After the war there will be need for them all. With the glories of their native land somewhat abated by the action of our valorous troops, and with a sense of the fair treatment accorded to them in a great war despite the stress of circumstances, they would be prepared to submit themselves to something better than naturalization—the mere letter of nationhood—and accept what is larger, patriotism, which is the nation's very breath and spirit.

## Corporational and Personal Cleanliness

THE average mine village is none too cleanly. Some there are which are models in this respect, but in too many cases little attempt is made to keep them clean. What the tenants have to waste they throw on the roadways where a kindly wind may or may not carry it away, if it be light; where animals may devour it, if it be edible; or time convert it into some unobjectional form of matter, if it be perishable.

Some people have tried to blame the street conditions of mine villages for the present influenza epidemic, but if there is any relation between the two it is most indirect. What relation there is may be briefly stated as follows: Tenants who keep and are allowed to keep a noisome street are apt to be careless in the home and to omit these precautions which will prevent the spread of influenza.

The disease largely spreads by reason of personal uncleanliness. If everyone kept his own towel, soap, washrag, pencil, pen and pillowslip; if there had been no promiscuous dipping of individual spoons, knives and forks into a common dish; had knives not been used as forks; if individual knives thus used had not been allowed to slice butter from a common roll; had spitting and sneezing been controlled; had soiled handerkerchiefs been placed in a separate receptacle so that they could be dumped into scalding hot water where the germs in them would not be able to infect the clothes of others; had rooms been properly ventilated day and night, and had all cups and saucers been plunged into scalding water after being used, the germs would have been propagated only with difficulty and probably not in such an intensive way that they could not be resisted by those in good health. Frequent cleansing of the hands would also assist in keeping germs from the mouth. Cleansing the teeth and applying a little antiseptic to the throat and nostrils would give further assurance.

All this seems a terrible waste of time and effort, but who shall say it is unreasonable seeing that the little town of Wishaw, near Punxsutawney, Penn., lost from influenza 65 inhabitants, or one in every six persons. The neighboring town of Du Bois, in a frenzy of fear, is washing its streets with the hose daily and compelling the business men to flush the sidewalks every morning. Excellent measures these, but not nearly as important as that domestic hygiene which is too often neglected.

At the mines of the Lehigh Valley Coal Co., up in the anthracite region, 784 men were laid off at one time. How many of sick there were, in all, it is hard to say. There are probably more in the mines of other companies, for the Lehigh Valley Coal Co. has a splendid nursing and medical system where others have none of the first and less of the second, and have not taught hygiene in season and out of season as has the Lehigh Valley Coal Company.

Just think what the loss of wages must be from such a disturbance as that described. How many towels, pieces of soap, washrags, tooth brushes and glasses might be purchased with the money thus wasted. How many ablutions and scaldings could have been paid for with the money had it been earned! We have yet to learn the cost of disease in decrease of earnings and in loss of life. Some day we will perhaps admire in full measure the old Mosaic laws which kept a people alive when occupying the houses, operating the farms and drinking from the wells of a people who were fast dying out from virulent disease.

With our epidemics we have two mental periods. In one we say we do not know whether the threatened plague will come, therefore why waste time and effort and make ourselves foolish by ridiculous prophylaxis. Then the epidemic steals on us, and we take a new viewpoint. "The evil has reached its height. Those appointed to die are dead. The living are more or less immune, so why worry?"

We shall persist, it is to be feared, in our unprophylactic methods till the next epidemic, though perhaps if we used ordinary methods of self-protection it might never invade our homes. At no time can we train people in hygienic methods as well as we can immediately after an epidemic. We need now to get ready for the return of the disease that is promised for the spring. Had we acted early we could have doubtless prevented the scourge from invading America and spreading from shore to shore.

One great source of danger too often overlooked is the barber. That functionary should be more careful than ever about his ablutions, and when epidemics are rife he should wear a mask for the protection of himself and his patrons. In many towns the barber shaves, and thus infects, a large proportion of the people. A word from the owner of the mine would do wonders for sanitation in which, alas, few barbers have any devoted belief.

# Don't Let Up Till He Puts Up Both His Hands

**On hearing that the Kaiser had given up his throne and that the surrender of Germany was to be expected any moment, many miners quit work entirely. At other mines men took a day off so that they could celebrate an event which may not occur for several months.**

**To Your Shovels and Your Picks, Mine Workers, the Hun Is Not Yet Downed!**

# DISCUSSION BY READERS

## Estimating Power in Haulage

*Letter—No. 1*—Kindly permit me to draw attention to one or two errors, in the reply to an inquiry regarding the manner of estimating the power in mine locomotive haulage, which appeared in *Coal Age*, Sept. 26, p. 615.

The weight of the loaded trip, which is given as 40 tons, is evidently estimated on the weight of coal hauled, instead of on the weight of the loaded cars in the trip, which is $25(3200 + 1200) \div 2000 = 55$ tons. Also, it is quite evident that the fraction, $\frac{1}{16}$, used for determining the tractive effort of the locomotive from its weight, is a typographical error for $\frac{1}{8}$. Permit me to say, however, that even this fraction would be low.

For steel-tired locomotives, the tractive effort may be taken as high as $\frac{1}{4}$ and, for chilled-iron wheels, $\frac{1}{5}$ of the weight resting on the drivers. Making these corrections and assuming the above factor for steel-tired locomotives, gives for the weight of locomotive required as $7\frac{1}{2}$ tons; or, for chilled-iron wheels, say $9\frac{3}{4}$ tons, the power, in the first instance, being 63 hp. and in the second instance 65 hp. But, this horsepower should not be confused with the horsepower rating of the locomotive given by the various manufacturers, in setting the size of motor for locomotives. The characteristics of each motor must be considered.

### MANUFACTURER'S METHOD OF ESTIMATING POWER

It is my custom, in making this calculation, to multiply the weight of the loaded trip hauled by the sum of the track and grade resistances, and divide this product by a constant determined by the kind of wheels with which the locomotive is equipped, less the sum of the track and grade resistances.

Thus, taking the sum of these resistances, as given in the reply to this inquiry, as 60 lb. per ton, and the weight of the loaded trip as 55 tons, and using a factor of 500 for steel-tired locomotives, I find, for the required weight of locomotive, in this case

$$W = \frac{55 \times 60}{500 - 60} = 7\tfrac{1}{2}\ tons$$

In like manner, using a factor of 400 when the locomotive is equipped with chilled-iron wheels gives for the required weight on the drivers,

$$W = \frac{55 \times 60}{400 - 60} = 9\tfrac{3}{4}\ tons$$

Now, taking the efficiency of the motors as 90 per cent., and multiplying the weight of the locomotive resting on the drivers by its tractive effort per ton (500 for steel tires and 400 for chilled-iron wheels) and that product by the speed of hauling, in this case, 500 ft. per min., and, finally, dividing the last product by the efficiency of the motors and again by 33,000 gives the required hopsepower. Thus,

Steel tires, $H = \frac{7\frac{1}{2} \times 500 \times 500}{0.90 \times 33{,}000} = 63\ hp.$

Chilled-iron wheels, $H = \frac{9\frac{3}{4} \times 400 \times 500}{0.90 \times 33{,}000} = 65\ hp.$

Track resistance depends on type of bearing and the condition of wheels, track and bearings and may vary from 10 to 50 lb. per ton. E. STECK.

Chicago, Ill.

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[We thank this correspondent for drawing attention to the inadvertent errors in the reply to the inquiry mentioned. However, we cannot agree with his suggestion to use a smaller factor than $\frac{1}{8}$ of the weight of the locomotive resting on the drivers when determining its tractive effort, in coal mining practice.

### MINING CONDITIONS REQUIRE CONSERVATIVE AND SAFE ESTIMATE OF POWER

*Coal Age* has often drawn attention to the fact that the conditions existing in coal mines are such as to make it advisable to use a factor representing an adhesion of the wheels to the rails sufficiently small to insure that the tractive effort thus found will not be overestimated. Nothing is more exasperating or annoying in mining practice than to find that a locomotive will occasionally fail to haul the estimated load, because of a condition of the track so common in coal mining. It is far better to be on the safe side and underestimate the tractive effort of a locomotive than to err on the other side.—EDITOR.]

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## Steel Tires vs. Chilled-Iron Wheels

*Letter No. 1*—I have read with considerable interest and profit the articles presented in *Coal Age*, relating to mining equipment. The character of the equipment used in a mine should be vitally associated with the production of coal, as well as directed toward increasing the safety of mining operations. Much attention and good judgment based on experience must be given the matter of rolling-stock equipment and the maintenance of track in mines.

In this connection, it has occurred to me that much can be said with profit regarding the relative utility of steel tires and chilled cast-iron wheels for mine cars and locomotives. I believe that the cast-iron wheel on mining locomotives is more general than steel wheels or wheels equipped with steel tires. This is probably owing to the fact that the cast-iron wheel is cheaper and, perhaps, more readily obtainable.

In respect to the relative service given by these two types of wheels, it is worthy of note that where comparative tests have been made, the steel wheels, or wheels with steel tires, have been shown to give the most satisfaction. In many instances, it has been found that they have given two, three and four months'

more service under severe conditions of hauling. At times, it has been found that the steel tires last twice as long as a cast-iron wheel. Also, after a steel tire has been worn considerably, it can be turned down to the depth of the blind flange.

In the operations of hauling it is true that the steel wheel has been found to require much less sand than a cast-iron wheel, the amount being about half as much when pulling the same load. Further, a locomotive equipped with wheels having steel tires possesses the advantage that it will pull a much greater load on the same grade, as one equipped with chilled cast-iron wheels. The steel appears to take a hold on the rails, while the cast iron has a tendency to slip, even when pulling a light load. In my experience, I recall an instance where a 10-ton electric locomotive equipped with steel tires pulled a load weighing 10 tons heavier than another locomotive equipped with cast-iron wheels could haul on the same grade.

These facts are extremely interesting to the mine operator, as they show the advantage to be gained by enabling the locomotive to pull a much greater load by reason of this item of its equipment, while consuming the same power and yielding a longer service, which means a great saving in the cost of operation. Even the sand saved is no small item in the mine expense, where the haulage road has some grades requiring its use. W. H. NOONE.

Thomas, W. Va.

## The Miner and His Pleasure

*Letter No. 6*—The letters in the discussion department of *Coal Age* are always interesting to me, but none have given me greater pleasure than those that have been written on this subject, as I am a miner myself and know what it means when one is obliged to forego the pleasure of the few hours he spends on the surface and devote these wholly to the interests of his country.

We have, in our locality, several mines, none of which are the heaviest producers, however, but employ an average of about 200 men. I believe I am safe in saying that 95 per cent. of these men work every day the mines hoist, while 3 per cent. of them may lose a day or two a month and the remaining 2 per cent. perhaps a little more.

### MINERS SET ASIDE PLEASURE TILL AFTER THE WAR

Let me say that our miners here enjoy the pleasures of life about as well as any to be found anywhere; but they seem always willing to lay aside their pleasure trips, drunks, etc., until a more convenient season. It may surprise many to learn that about 50 per cent. of the miners in this immediate field own their own homes, and very attractive little homes they are, too.

It was a very common sight, the past summer, to see miners out digging in their war gardens, who, heretofore, had been accustomed to spend their evenings automobiling, playing cards, or loafing in the pool rooms and on store fronts. Almost without exception these men have answered the call to duty, and their evenings are now spent at work in the gardens. It is my belief that they derive as much pleasure in this work as when the hours were formerly spent in pleasure. As the season advanced, and the gardens began to take on a productive appearance, there was a sharp rivalry between neighbors, and a pardonable jealousy was often aroused when another garden nearby appeared a little more advanced than one's own. In other words, the gardening scheme was competitive, each striving to outdo his neighbor.

### WORK OF MINERS IN FOURTH LIBERTY LOAN

Speaking of automobiling, several of our boys own cars, but not many trips are taken that lose the owner of the car a shift in the mine. As showing the patriotism of our little community, however, I need only mention the way the Fourth Liberty Loan went over the top in a single day's time, in our township, which is one of nine townships in the county. Our population is principally miners, while the adjoining townships are chiefly farmers, retired farmers, merchants, bankers, etc. We have one town of about 2500 inhabitants and six or eight small villages in our township, while another township has a small city of 6000 or 7000, besides villages. In the recent drive our quota was $82,500, while that of the remaining township was $237,000.

When the drive started, Sept. 28, everybody in our township got busy at once, with the result that we went over the top at noon and had an overplus of $10,000 at 6 p.m. that first day, and there were yet several to be solicited. Two days later, Sept. 30, another township was $48,000 behind its quota, and the remainder of the county is $127,000 behind. It is no exaggeration to say that our men have derived much pleasure from the results of this drive in the Fourth Liberty Loan. Everyone is happy.

### OBSERVE STRICTLY BAN ON USE OF GASOLINE

Before closing, I want to say a word on the ban on gasoline. Sunday is the only day the miner really has for rest and pleasure; but the announcement of gasless Sundays found our men well content to abide by the ruling. Although our local fuel administrator gave his permission for the use of an automobile where a man had a long distance to walk to church or to his work at the mine, in one or two instances, such a use was hailed by the cry of "slacker," and, it is needless to say, that put an end to the use of autos on gasless Sundays.

No! The feeling here is that we have no time for pleasure as long as our boys are sacrificing their lives on the battlefields of Europe. Our purpose is to produce enough coal to meet all demands and carry the war to a successful issue and freedom and liberty are proclaimed in Berlin. VICTORY.

————, Ind.

## The Wagon Mine a Menace

*Letter No. 3*—While I cannot agree with everything said by H. E. Gray, in his letter, *Coal Age*, Aug. 8, p. 282, I am in favor of closing most of the small wagon mines, so many of which have been opened recently and have a tendency to draw miners from their work in larger mines where they would be able to mine and load a much larger amount of coal.

My conviction is that a miner will produce more coal in a day when working in a large mine equipped with up-to-date machinery than he could if employed in a small mine not possessing the same advantages. There are many reasons for this.

Ordinarily the ventilation of these smaller mines is poor, owing to the fact that there is not enough coal in the tract to pay for building and operating a suitable fan, and the mine must depend perhaps wholly on natural ventilation, or that produced by a furnace.

### Small Operations Lack Necessary Capital

Again, the usual operator of a small mine has not the capital to install pumps or other suitable means of drainage. Instead, he must employ waterboxes, which afford a poor means of keeping the mine free of water. Anyone familiar with the use of waterboxes knows what a disagreeable task it is, especially in the winter time when one is liable to contract a serious disease if obliged to work all day in wet clothing, to say nothing of walking two or three miles to his home at the close of the day.

Further, the small operator generally employs no particular system of mining. Such is his desire to put out coal and realize on his investment, that he adopts the quickest means of accomplishing this. The majority of small mines are opened and operated on the single-entry system. Rooms are turned off this entry as fast as the place is extended, and what ventilation is provided must pass through these rooms. The result is that the circulation is often blocked by a fall of roof in one or more of the rooms and the men suffer for want of air.

Conditions in respect to timbering and haulage of coal are practically on a par with those just described. Mules are employed on all the roads in the mine. Light iron and even wooden rails are used, resulting in many wrecks and delays and increasing the danger to the workmen.

### Modern Equipment Means Greater Production

There is truth in the statement of George Bowker, in his letter of Sept. 5, p. 464, that every ton of coal mined is that much help in winning the war; but he must remember that the miner working in a small mine and producing four or five tons of coal a day would probably be able to mine from ten to twelve tons a day in a large mine equipped with modern machinery and appliances. The difference between the man's actual production and his possible output represents our loss and the Kaiser's again.

Speaking of clean coal, I agree with Mr. Bowker that the small mine compares favorably, in that respect, with the larger mine, except where the former may be working outcrop coal, which is more or less impure and cannot be satisfactorily cleaned, since the coal itself is of a low quality. However, his statement that the small operator visits the working places every day to inspect them and see that the men are working under same conditions is far from the truth. It is the exception where a small operator does not devote all of his time to working in a place by himself or superintending the hoisting and loading of coal at the surface and other matters, which seldom leave him any time for inspecting the working places of his men.

While the majority of so-called "wagon mines" are operated under the conditions I have described, there are a few of these that, while obliged to haul their output from the tipple to the railroad for shipment, do not deserve the same classification as the local wagon mine. Many of the former are equipped with good machinery and work enough men to call for state inspection by the district mine inspector. Let me suggest that any ruling regarding the operation of small mines should discriminate in favor of such as these.

A competent committee should be employed by the Government to look into the matter and decide what mines are being operated to advantage, and should be permitted to continue operations, and what mines should be closed for the period of the war.

Cleaton, Ky. Ostel Bullock.

## Transportation of Coal by Canal

*Letter No. 4*—Last March, there appeared in *Coal Age* [Vol. 13, p. 402] an article by W. W. Wotherspoon, superintendent of public works for the State of New York, regarding the cost of transportation on the New York Barge Canal, the operation of which has been taken over by the Federal Government.

A little later the question of the relative cost of transporting coal by railroad and canal was discussed, in *Coal Age* [Vol. 13, pp. 938, 1075, 1172] by Mr. Wotherspoon and myself, with a view to showing the practicability of utilizing the canal system of the state for that purpose and the ultimate effect on the taxpayers.

Shortly after the Government assumed charge of the canal, Mr. Tomlinson, the operating manager for the Government, wrote a letter to the New York Chamber of Commerce, in which he said:

> The Government has established identical rates for canal and rail service. . . . But business is not being offered to the canal. . . . I am compelled to admit that traffic if not at a standstill is very small in volume. . . . I have contracted for a considerable fleet of large new steel and concrete boats, which will be built in a few months provided material for their construction is forthcoming.

Following this is Mr. Wotherspoon's statement, in the New York Times, June 22, "We have experienced much disappointment in our attempt to influence private capital to form boat lines and engage in the canal business." Again, June 25, Alfred H. Smith, Regional Director for the Government for Eastern Railroads, for the purpose of inducing shippers to use the canal, issued a tariff making the Railroad rates 20 per cent higher than both canal and former railroad rates.

In view of the foregoing statements, it would be interesting to learn the following facts regarding the operation of the canal under Government control:

1. How many boats have been built by private owners, and what is their carrying capacity?
2. How many boats have been built by the Government and what is their capacity?
3. Has the 20 per cent. raise in the railroad rates resulted in private shippers sending their freight by the canal instead of by rail?
4. If private shippers are using the canal, how many through trips of loaded boats were made from Buffalo to Albany only, and what total tonnage did they carry?
5. How many through trips were made from Buffalo to New York, and what was the total tonnage carried?

6. How many empty trips were made between Buffalo and Albany, in both directions?

7. How many empty trips were made betwen New York and Buffalo, in both directions?

8. What has been the average time of trips between Buffalo and Albany, and between Buffalo and New York?

9. What has been the total tonnage, including through and local, carried on the canal proper, between Buffalo and Albany, in both directions?

If *Coal Age* can obtain answers to all or any of these questions, from either Mr. Tomlinson, Mr. Smith or Mr. Wotherspoon, considerable light will be thrown on the subject of whether the canal will prove to be the economic and commercial success that its advocates have prophesied would result. G. W. WILKINS.

Pittsburgh, Penn.

# Air-Cylinder Lubrication

*Letter No. 1*—I have been very much interested in the inquiry on this subject contained in *Coal Age*, Sept. 12, p. 522, and the reply to the same. My interest in this subject is greater owing to the fact that we have experienced, in our plant, the same trouble from the accumulation of a carbon residue in the air cylinder of our compressors. In some instances, the residue has so choked the valves as to interfere with the proper operation of the compressor.

For a long time, we sought to find a proper remedy for this difficulty, which not only caused much trouble and annoyance but was expensive to remove. It would happen that from two to three times a year, it was necessary to take the compressor apart and scrape the residue out. At times, we have put the cylinder in the lathe, for the purpose of cutting away the deposit from the metal.

### EMPLOYS A CARBON REMOVER WITH GOOD RESULTS

After awhile, we learned, through a friend in charge of a large plant, of a carbon remover that he was using that had given good results. It was known as the "J & J" carbon remover. My friend had found that it was also very useful in cleaning out the gummy deposit and carbon residue from gas-engine cylinders. The gummy deposit, he explained, came from the use of a lubricating oil that was not adapted to gas-engine practice. The "J & J" carbon remover cleaned out the cylinders and the valves, in every case.

We had been frequently troubled with a residue that formed a coating similar to oyster or clam shell. Upon the recommendation of my friend, I determined to use the carbon remover he named. Instead of taking the cylinder apart and cleaning it, as previously, I simply attached a belt and ran the compressor, injecting some of the carbon remover through the air valves. The result was simply marvelous, as it cleaned the valves and cylinders from the deposit, which gave no further trouble.

Since that time I have recommended the use of this carbon remover to others. We have found that, by using a small quantity of it, occasionally, the cylinder and valves are kept clean and no trouble is experienced in the operation of the machine. I thought that this information would be of interest in connection with the subject discussed and offer it quite gladly.

———, Colo. B. B. T.

# Travel of Electric Current

*Letter No. 6*—Kindly permit me to refer to a few of the statements made by correspondents who, in attempting to give their understanding of the question of whether an electric current flows through the body of a conductor or over its surface only, may have confused the matter in the minds of many.

The flow of an electric current in a conductor is a question that should be left to scientists only, as it possesses no practical value for the electrical engineer. For the most part, the statements made by others are prone to give the impression that there are still great unknown mysteries about electricity, which tends to develop a lack of confidence in the work of the practical electrician.

As a matter of fact, there is probably no other branch of engineering in which the basic facts relating to the application of any particular form of energy to the work it is designed to perform is more perfectly known than in the electrical field. I would even say that the electrical engineer is able, in most instances, to work with far greater precision, in designing means for utilizing the power he employs, than most other engineers.

### PRACTICAL APPLICATION OF ELECTRICAL POWER

While it is not known what electricity is, and its nature may not be understood completely, this fact does not hinder the utilizing of this form of energy by the practical engineer. Speaking of the flow of current in a conductor, correct and reliable results are obtained by assuming that a direct current flows practically uniformly throughout the entire section of a conductor, whether the latter be magnetic or nonmagnetic. As has been stated, in the use of alternating current there is a tendency of the current to flow near the surface of a conductor, rather than in its interior. This has been spoken of by some as a "condensation of the current at the surface of the conductor," but is more commonly described as "skin effect."

It can be said, with more or less certainty, that the three factors concerned in this characteristic of alternating current are: The frequency of the current; the magnetic quality of the conductor; and its nearness to the return, which apparently exerts an influence beyond itself having a tendency to modify the flow.

However, in his practical work the electrical engineer can safely forget all that scientists have said about the flow of an electric current not being confined to the conductor. Scientists may have good and proper reasons for this assumption. In like manner the practical engineer, with the exception, perhaps, of the electrochemist, may forget that electricity probably flows from negative to positive, or in the opposite direction to what is universally assumed, which is from the positive to the negative element or electrode.

In other words, our highly esteemed Benjamin Franklin, who formulated this long established theory, may have guessed wrong. But the point I wish to emphasize is that these scientific questions should only concern the practical engineer, in as far as they have a bearing on the use he wishes to make of the matter in practice. Otherwise the discussion may do more harm than good by casting doubt on results already accomplished.

Kansas City, Mo. ELECTRICIAN.

# INQUIRIES OF GENERAL INTEREST

## Working a 22-Deg. Pitch

I am the foreman of a mine here that has been opened in a seam pitching 22 deg. The coal varies from 3 ft. 6 in. to 4 ft. in thickness and is full of spars, rolls and dykes. The coal has been worked thus far by driving dip planes and turning rooms on 60-ft. centers. Owing to the bottom being quite uneven, it is impossible to drive the rooms on sights; but they must follow more or less the contour of the floor, so as to avoid the necessity of brushing the roof to obtain headroom for the cars. The rooms are widened out on the lower side to a width of 20 ft. The coal is cut with a Sullivan iron-clad, electric chain machine.

Formerly, the rooms were widened on the upper side of the track, but this was changed and they were then widened on the lower side, because so much trouble was caused by the rooms cutting through the pillar. In many cases, hardly any pillar was left, and what remained was too hard to get and did not pay. To avoid this trouble, the company decided to change and widen out the rooms on the lower side of the track.

I have been trying to find a way to widen out the face so that the machine can do better work. It is hard to cut the rooms downhill, and there is not sufficient room to square the machine around and "sump in" at the lower corner so as to enable the machine to cut uphill.

The machine cuts in the bottom slate, which is very soft. Indeed, the bottom is so soft that it is necessary to use planks under the machine. Much time is required to unload the machine and "sump in" and then load it again when the cut is finished. The difficulties encountered in working this seam have caused me to wonder if there was not a better method to employ and one that would give less trouble and produce better results.

In studying over the matter, I thought it might be worked on the longwall panel system that I have seen described in books. Neither myself nor any of the men working with me have had any experience in longwall work. The most of our miners are Mexican and Spanish miners and require much care and watching. I shall be glad if *Coal Age* and its readers can give me any suggestions in regard to a better method for working this seam. MINE FOREMAN.

Madrid, N. M.

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It is difficult to give a wholly intelligent answer to a question of this kind and suggest a method of working that would be adapted, in every respect, to the conditions described in the inquiry. In order to form a correct judgment, in the mining of any coal seam, it is necessary to be well acquainted with the situation in all its details. Without being on the ground and making a careful survey of the proposition, it is only possible to give, in a very general way, the outlines of a method that would seem to be adapted to suit the conditions described by this correspondent.

In the first place, assuming that the rooms are driven, on 60-ft. centers, off the dip inclines and widened out to 20 ft., as stated, the thickness of the remaining pillar would be 40 ft. It is hard to see how the rooms would cut through this thickness of pillar when widened on the upper side of the track; or how this difficulty would be avoided by widening out below the track.

However, it is stated that, owing to the uneven formation, the rooms have not been driven on sights. In that case, it is easy to understand that adjoining rooms might hole into each other at any time, unless great care was taken to keep them apart and maintain a good thickness of pillar. This, we assume, is the real cause of the rooms cutting through the pillar.

We understand that when the rooms were widened out on the lower side of the track, the difficulty arose of sumping in the machine, at the lower corner, so as to enable it to cut uphill, instead of starting the cut at the roadhead and cutting downhill. Our suggestion, in this respect, is that the rooms should be widened out, as formerly, on the upper side of the track so that the machine can start at the roadhead and cut uphill.

The necessary precaution must then be taken to maintain the full thickness of the pillar. There is no excuse, in good mining, for permitting rooms to hole into each other, especially where pillars are supposed to be left 40 ft. in width. If the rooms are not driven on sights, they should be surveyed at regular intervals and the position of the roads determined closely in order to avoid the trouble mentioned.

Speaking of longwall work in this seam, we would suggest working the seam on a panel system, by driving places off 300-ft. levels, say 100 yd. apart. When these have been driven up a suitable distance, say 75 or 100 yd., the pillar of solid coal between two adjoining places should be cut across at the face. This can be done by driving a crosscut 20 ft. wide directly across the pitch until it intersects the face of the adjoining place.

By this means, a panel of solid coal will be cut out 100 yd. square. This panel can then be worked out on the retreating system. The machine should start to cut the coal at one corner of the crosscut and cut the full width of the panel, or 280 ft. As the coal is cut and loaded, it can be taken along the face to the roadhead where it is lowered to the level or gangway and hauled to the main slope to be hoisted.

This system would have the advantage of giving the machine one continuous cut for a distance equal to the width of the panel which would mean much time saved in loading and unloading the machine, and sumping. As the cut is started from the roadhead in one of the rooms, it will not be necessary to sump in the machine.

We recommend this system of working as being best adapted to the conditions described. No doubt many of our readers who have had practical experience in the working of such seams will be able to give further suggestions that will be helpful.

# EXAMINATION QUESTIONS

## Miscellaneous Questions

*(Answered by Request)*

*Ques.*—What is the breaking strain and safe working load of a good steel hoisting rope $1\frac{3}{8}$ in. in diameter?

*Ans.*—For a six-strand 19-wire hoisting rope of crucible cast steel, having a diameter $d = 1\frac{3}{8}$ in., the breaking strain is calculated by the formula

$$S = 39d^2 = 39(1\tfrac{3}{8})^2 = 73.73 \text{ tons}$$

The safe working load varies from one-fifth to one-eighth or even one-tenth of the breaking strain, depending on the depth of the shaft, speed of hoisting and importance of the operation. In this case, for a depth of shaft not exceeding 100 yd., the safe permissible load may be taken as one-fifth of the breaking strain, or, say 15 tons.

*Ques.*—The current of air entering a mine is 32,000 cu.ft. at the inlet and 34,000 cu.ft. at the outlet. What is the cause of the increased quantity?

*Ans.*—Assuming that the observations have been carefully taken showing an increase of 2000 cu.ft. per min. discharged at the outlet, the cause may be ascribed to an increase in the temperature of the air current after it has passed through the mine workings. Since the increase, in this case, is one-sixteenth of the intake volume, the increase in temperature of the return current will require to be one-sixteenth of the absolute temperature of the intake air. Assuming the intake temperature is 60 deg., or 460 + 60 = 520 deg. absolute, the required increase in temperature would be 520 ÷ 16 = say 33 deg. F.

In other words, if the increase in the return volume is wholly due to the increase in temperature, the return air current must have a temperature, in this case, of 60 + 33 = 93 deg. F., which is not probable in the normal working of a mine. However, the intake temperature may be much lower, say 32 deg. F., while the return temperature will frequently be 65 deg. F., which would easily account for the observed increase in this case.

Another cause for increase in the return current, in a mine, is the generation of gas in the workings. For example, take a mine generating large quantities of gas, and assume an increase of 2000 cu.ft. per min. makes the return volume 34,000 cu.ft. If this increase is all gas the return air must carry (2000 × 100) ÷ 34,000 = say 6 per cent. of gas, which would show a highly dangerous condition in the mine that can hardly be supposed to exist.

Again, in both the blowing and exhaust system of ventilation the pressure on the intake air is always greater than that on the return. This decrease of pressure will cause a slight increase in the return volume. However, ventilating under, say a $2\frac{1}{2}$-in. water gage (2.5 × 5.2 = 13 lb. per sq.ft.), the atmospheric pressure due to 30 in. of barometer being 2160 lb. per sq.ft., the drop of pressure on the return, in this case, would represent only (13 × 100) ÷ 2160 = 0.6 per cent. of the absolute pressure on the air. Hence, for a circulation of 32,000 cu.ft. per min., under a $2\frac{1}{2}$-in. water gage, the increase on the return from this cause would be only 34,000 × 0.006 = 204 cu.ft. per minute.

Therefore, replying to the question asked, it may be assumed that the increase of 2000 cu.ft. in the return volume, in a mine generating no gas, is due largely to an increase of temperature in the mine when the outside temperature is low. Or, the observed increase may be due to all three causes mentioned.

*Ques.*—It is proposed to work a pump, which it is estimated will require 23 hp. to drive it. Give particulars of size of motor, dimensions of cable, etc., assuming the pump to be 1300 yd. from the dynamo.

*Ans.*—Allowing for a line drop of 10 per cent. makes the required power of the generator, in this case, 23 ÷ 0.90 = 25.6 hp. Then, estimating on a 500-volt circuit gives a current of

$$C = \frac{746H}{E} = \frac{746 \times 25.6}{500} = 38.2 \text{ amp.}$$

In order to transmit this current, a distance of 1300 yd. and return, allowing a 10 per cent. line drop, will require a copper wire having a sectional area (A), expressed in circular mills,

$$A = \frac{10.8 \times 2(1300 \times 3)38.2}{500 \times 0.10} = 64{,}360 \text{ cir.mil.}$$

Referring to a wire table, it is found that a No. 2 B. & S. gage wire most nearly corresponds to this requirement, the diameter of this wire being 257.6 mils, or slightly exceeding $\frac{1}{4}$ in.

*Ques.*—Find the size of an engine required to drive a fan to produce 200,000 cu.ft. of air per min., with a 3-in. water gage.

*Ans.*—In estimating the size of engine required to drive a mine ventilating plant, it is well to allow for the combined efficiency of the fan and engine of, say 60 per cent. The horsepower on the air required to produce this circulation is

$$H = \frac{(200{,}000 \times 5.2 \times 3)}{33{,}000} = 94.45 \text{ hp.}$$

Assuming an efficiency of 60 per cent., the required indicated horsepower of the engine is 94.45 ÷ 0.60 = 157.4 i.hp. Now, estimating on a piston speed of $S$ = 600 ft. per min. and a mean effective pressure in the cylinder of $p$ = 76 lb. per sq.in., the required sectional area ($a$) of the cylinder is

$$a = \frac{33{,}000H}{pS} = \frac{33{,}000 \times 157.4}{76 \times 600} = 114 \text{ sq.in.}$$

The required diameter ($d$) of the cylinder then is

$$d = \sqrt{\frac{114}{0.7854}} = \text{say } 12 \text{ in.}$$

Assuming a stroke of 18 in., the piston speed being 600 ft. per min., this engine must run at a speed of (600 × 12) ÷ 18 = 400 r.p.m.

# COAL AND COKE NEWS

## Harrisburg, Penn.

Urgent representations made to United States Senator Boies Penrose at Washington by state officials, and statements by W. J. Richards, president of the Philadelphia & Reading Coal and Iron Co., as to conditions in the anthracite field, have brought about the issuance of the order by the war department canceling the movement of drafted men from Pennsylvania to Camp Greenleaf scheduled for the week beginning Oct. 28. Under the schedule prepared 6740 men would have gone from Pennsylvania to the southern camp. It was impressed upon the army officers that there are many men ill and that drafted men would go from infected homes, while the coal production was being menaced at the same time.

From all parts of the Central Pennsylvania district messages are being received of Sunday work by the miners, who volunteered following the receipt of telegraphic requests for such service. In those districts where no Sunday work was done the men decided to work from nine to ten hours three or five days each week instead of eight hours, and two days at regular hours, so that the output might be increased. Mines in which the epidemic is prevalent worked with reduced numbers of miners, although several districts, notably the Clearfield, near DuBois, portions of Indiana, Jefferson, Clarion and Cambria, were obliged to suspend operations entirely last week.

## Hazleton, Penn.

While the daily papers have published figures showing the tonnage loss due to the influenza epidemic, the figures are not official, and no attempt has been made to total the loss in coal due to the disease, which appears to be on the decrease in Southern Schuylkill and moderating in the Hazleton region. The companies are doing all in their power to stamp out the discase. A daily report of every absentee reported "off sick" is made and nursing help given where needed.

Purchasing departments ordering brass valves and other brass goods are now required to furnish a Government affidavit when placing an order, and in this way they obtain permission for the manufacturing people to ship the material needed.

The Lehigh Valley Coal Co. has notified its Drifton shopmen that the recent wage increase will apply to them. Many of these employees were preparing to seek other employment, as they did not believe the new increase would affect them. The company's action will help to retain these men.

When the first Liberty Loan drive was on, John Markle, president of the G. B. Markle Co., authorized a reduction of 50 per cent. in the rental of the company's houses, giving the employees a chance to invest in bonds. In the Fourth Liberty Loan campaign, Mr. Markle authorized the purchase of $500,000 of bonds by the company in addition to the bonds bought by the men. The credit for the sale of the bonds was given to the villages where the Markle Co. employees reside.

## Uniontown, Penn.

The fuel production campaign for the Connellsville coal and coke region, which has for its aim the increasing of the average weekly output to 800,000 tons, 50,000 tons above the present maximum, opened this week under most discouraging conditions. Hardly had the campaign gotten under way when a car shortage paralleling that of last winter struck the region. This shortage is not due to a scarcity of cars, but the lack of railroad crews to move them. The condition grew gradually with the influenza epidemic, but did not reach an acute stage until this week, when it caused a virtual paralysis of the transportation systems in this region. Commencing on the Baltimore & Ohio system, the congestion has gradually extended until it has now affected all lines.

While the car situation had not reached the acute stage for the week ended Oct. 19, the weekly production of the region took a drop of 35,266 tons over the previous week. The output in terms of coal was 714,118 tons. Coal shipments aggregated 246,077 tons, while 312,027 tons were manufactured into beehive coke. In his weekly report to Director of Production J. B. Neale, W. L. Byers, manager of production, stated that had the car placements been normal the figures would at least have reached the last high record of Oct. 12, despite the loss of some 600 workmen because of influenza.

The bone-dry liquor order of the state health department is still in effect, but its good results have been nullified by the combination of car shortage and influenza at the plants.

## Charleston, W. Va.

There was not as much of a drop in production in the Tug River and Pocahontas districts as might have been expected in view of the fact that there were 2100 cases of influenza in those regions, the decrease being only 394 tons during the week ended Oct. 19, as compared with the previous week—tonnage produced being kept up to 463,151. Tonnage lost from all causes was 588,684. An increasing car shortage cost 17,539 tons in production, while 37,457 tons were lost because of a shortage of labor. No loss, at least no material loss, in the coke output was recorded, the production of coke being 50,627 tons.

The output for the Fairmont district has been reduced by half during the last few weeks. That is not hard to understand when it is said that the car supply, for instance, on Oct. 19 was only 613 cars, on Friday 579 cars, on Thursday 770 cars, and that on all three days only 500 cars have been placed on time. The loss of production in the field the week ending Oct. 19 varied between 33,000 and 47,000 tons a day. On Oct. 19 there were over 4000 men idle and out of 177 mines reporting 53 were shut down. Lack of cars has caused much enforced idleness and of course has seriously interfered with the movement for the increased production of coal.

Mines in the Upper Potomac region, especially in Mineral County, have been hard hit. This has been particularly true at Elk Garden. A telegram from that point to Governor Cornwell this week requesting two doctors and a few nurses stated the situation was serious and that the coal mines had been paralyzed.

Heavy inroads were made on production in the Kanawha region the week ending Oct. 19 through the wider prevalence of influenza, and even at points where there were comparatively few cases fear of the disease tended to keep the men out of the mines, thus making it impossible to secure the capacity output. As a result of such conditions production dropped from 178,000 tons to 148,380 tons. Some idea of just how badly crippled the mines are may be gathered from the fact that only a few weeks ago 217,000 tons were produced. Total hours worked during the week under review were reduced to 4482. There was a greatly augmented shortage of cars, 1029 hours alone being lost from that cause. The labor shortage was responsible for the loss of 733 hours.

Production sagged in the New River district the week of Oct. 19. While in some parts of the district there was a tendency to take advantage of the situation created by the influenza epidemic, nevertheless on Loup Creek and in that part of the district on the main line of the C. & O. sickness kept many men out of the mines. Taking both the New River and Winding Gulf districts there was a decrease of 15 per cent. in production, as compared to the preceding week. This decrease may be attributed solely to the prevalence of influenza and a car shortage on the C. & O. Cars were plentiful on the Virginian Railway.

## Birmingham, Ala.

The coal-mining situation in the Birmingham district at present is not as bright as it might be, the influenza epidemic making itself heavily felt throughout the district. In several camps the physicians themselves were stricken with the disease and were unable to attend sick miners. The state health authorities and the Government were applied to for assistance, and physicians have been sent those asking for them.

The production of coal for the week ending Oct. 12 was 382,846 tons, against 409,022 tons for the week ending Oct. 5. Transportation facilities in the district have been good recently, everything considered. Operations at mines throughout the district have been greatly curtailed during the past ten days, and as a consequence, the demands for cars were not so urgent. In other traffic, however, there has been no decrease in the demand for cars. The records show an exceedingly fine business being done by the railroads.

The Woodward Iron Co. is planning extensive improvements to its plant at Bessemer during the coming year, according to rumors in industrial circles and especially at Bessemer, where the improvements will be made. The taking on of H. M. Urban, former superintendent of the byproduct plant of the Tennessee Coal, Iron and Railroad Co. at Fairfield, is declared most significant.

## Victoria, B. C.

In view of the discussion as to the production of British Columbia's coal fields this year, and the possibility of the output meeting at least the most pressing demands, both domestic and foreign, it is interesting to give the results of a rough estimate made by a high authority. Up to the end of the month of August the production was 1,821,681 tons, and an estimate of the output of the month of September (the returns being not yet available) is 167,301 tons, making a total of 1,988,982 tons up to the last day of last month. From this must be taken 221,840 tons, which was used in the making of coke. The total coal marketed from this Province for the first three quarters of the year, therefore, would be 1,767,142 tons. At the conservative valuation of $5.50 a ton, this would be $9,719,281. In this period it is estimated that the Crow's Nest Pass Collieries had produced 130,389 and the Canadian Collieries (D) Ltd. 19,196 tons of coke, a total of 149,585, which at a valuation of $9 a ton, equals $1,306,265. So that the value of the coal production of British Columbia may be said to aggregate approximately $11,025,546.

The opening up and development in a small way of coal outcroppings is being given more attention in British Columbia as a result of the increased demand and the higher prices received for coal. One of the most important of these is situated on the Grand Trunk Pacific Ry. not far from the City of Prince Rupert. The Government has assisted in the construction of a road to the property, and the owners and operators are confident that they will be able to take care of the greater part of the domestic demand of Prince Rupert and the adjacent district this winter. Another enterprise of a somewhat similar nature is that of the Osoyoos Coal Co. at Ashnola, nine miles from Princetown, B. C. This has been reopened and the coal will be hauled into Princetown by motor trucks for local use and for shipment by railway to outside markets.

### PENNSYLVANIA

#### Anthracite

**Jeddo**—The G. B. Markle Coal Co. has installed 30 cots in the Jeddo Casino, which will be used as an emergency hospital for influenza victims.

**Tamaqua**—The Maryd Coal Co., operators of the Maryd colliery, near Tamaqua, have lost 18 miners by death, due to the influenza.

The Mill Creek Coal Co. has electrified its New Boston colliery, and the same work is now under way at the Shepp mine at Tamaqua, Penn.

**Hazleton**—M. S. Kemmerer & Co., operators of the Sandy Run colliery, have let the contract for an addition to their breaker.

#### Bituminous

**Waynesburg**—A deed was recently recorded here by which W. F. Bute disposed

of a one-half interest in four tracts of land in Green and Monongahela townships, Green County, to W. Harry Brown, for a consideration of $55,211.04.

**Uniontown**—O. M. Coughenour, of Uniontown, has sold a one-half interest in the coal underlying three tracts of coal land in Green and Monongahela townships, Green County, to W. Harry Brown, of Pittsburgh, for a consideration of $1.

**Greensburg**—All production records for the Westmoreland district were broken last month, when the mines produced 401,000 tons of coal. The output was 13,000 tons in advance of the previous high mark of the district since the coal production campaign began July 1.

**Boswell**—The Atlantic Coal Company is abandoning its mine at Boswell, Somerset County, on account of the large number of rolls and faults encountered in the seam. This mine is in what is known as the "E1" seam, the company having previously exhausted the "C1" seam of coal below it.

**Homer City**—The Homer City Coal Co. is erecting a bathing and dressing house for its miners at its Tearing Run Mine near here. The building will include shower baths, dressing rooms and clothes-drying room. There is also provided a first-aid room and a room for use of the officials.

**Fallen Timber**—Announcement has been made that M. Hempskie, a coal miner at the local plant of the Fallen Timber Coal Co., recently broke all records for large earnings. A total of 116 tons of coal was mined in two weeks, including 17 yards of main heading, 13 yards of back heading, and four yards of room, for which he was paid $246.28.

**Orbisonia**—James L. Devveny, broker, reports the sale of the Daugherty mine at Rocky Ridge, Huntingdon County, to Thomas and Roth of Wilkes-Barre. The mine has been operated by Henry M. Kerr, of Philadelphia. The new owners will greatly increase the production by installing new machinery and making a number of improvements.

**Uniontown**—The Vanderbilt Coal and Coke Co. has taken over the old Clarissa plant of the James Cochran Sons Co. and has resumed operations at the works. Eighty ovens have been reconstructed and a number placed into blast. More will be fired when labor conditions permit. A new tipple has been erected. Forty-four houses at the plant have been repaired. Between 75 and 100 workmen are employed at the plant, of which A. C. Stickel is president and Gaetano Corrado of the same place is treasurer and general manager. What coal is not used at the plant is shipped for by-product purposes.

### ILLINOIS

**Freeburg**—The five mines in the vicinity of Freeburg have been facing a shutdown during the past week for lack of water. The lake and ponds from which they had drawn their supply had about gone dry, and the Government had interdicted the bringing of water from the Okay River at New Athens in tank cars. Rainfall has in a measure relieved the situation.

**Williamson**—The Mt. Olive and Staunton Coal Co. has offered a reward of $500 each for the bodies dead or alive of the four men who robbed the company's cashier here on Oct. 15 of $14,000, and an additional bonus of $1000 if all are taken together, and 10 per cent. of all or any part of the stolen money that is recovered. Information is to be communicated to B. G. Valentine, Chief of Police of Staunton, Ill. The men are described as dark complexioned, apparently either Italians or Greeks, between the ages of 20 and 25. Three were smooth shaven and wore caps. One had a black mustache and wore a black soft hat. They escaped in a new black automobile.

**O'Fallon**—Steps are being taken to resume construction work at the O'Fallon mine, which was stopped some time ago on account of financial embarrassment of the promoters, John Hargraves and W. A. Knapp. The property has been taken over by Albert W. Black, John L. Lamont and William S. Fotheringham, of Bay City, Mich., to protect a loan which they made when the sinking of the shaft was begun. Besides the unfinished mine they find themselves with about $70,000 obligations on their hands. Arrangements have been made to compromise the claims with the exception of those of the miners, which will be paid in full. The shaft will be completed at an estimated cost of $200,000. A new pump has been installed and the water is being drawn from the shaft. Two carloads of machinery are on the way. Alex Jeffrey, of Bay City, will be general manager, and Oscar L. Pyle, of O'Fallon, will superintend the construction work.

### OREGON

**Marshfield**—The old Klondyke coal mine of Beaver Hill was opened recently for the first time in twenty years and 160,000 tons of coal was found in the tunnel. The output will go to the Government for fuel in engines used in hauling logs from the Boutin tract of spruce now being cut by the Government, which has a force of 200 men at work building railroads to the mine and to the timber. The Government has contracted for the entire output, and any surplus not used by the engines will be handled by the Fuel Administrator.

### WASHINGTON

**Chehalis**—W. F. West, W. D. Sheldon and Ben Sheldon, owners of the Sheldon Coal Co., have disposed of their interests in the mining property near the town of Coal Creek to Gay & Olson Co., of Tacoma. The property is to be immediately placed on a production basis of 550 tons per day. At present an 8 ft. sub-bituminous vein is being worked. A new slope is to be sunk at once.

## Personals

**O. P. Chatfield** has severed his connection with the Kanawha Central Coal Co. and will hereafter be associated with the Carbon Fuel Co.

**W. B. Plank** has been transferred from the Bureau of Mines Rescue Station at Urbana, Ill., to take charge of the Bureau of Mines Rescue Station at Birmingham, Ala.

**E. T. Twescher** has been appointed office manager for the Campbell's Creek Coal Co.'s harbor at Point Pleasant. Mr. Twescher was formerly with the Producers Coal Co. at Cincinnati.

**B. E. Geer**, of Greenville, S. C., has been appointed fuel administrator for South Carolina. He is a manufacturer of cotton goods. He succeeds **B. B. Gossett**, who has entered the military service.

**Jerome Watson**, of Neffs, Belmont County, Ohio, has been appointed chief mine inspector for Ohio by the Ohio Industrial Commission, to fill the vacancy caused by the death of L. D. Devore. He has assumed his duties.

**J. C. Maguire**, formerly construction engineer for the Wilmot Engineering Co., Hazleton, Penn., has entered the service of Wentz & Co. as mechanical engineer. Mr. Maguire will have charge of breaker machinery, a line in which he specialized while with the Wilmot company.

**W. D. Tyler** has been made acting director of the Bureau of Prices of the Federal Fuel Administration. For the past twelve years, Mr. Tyler has been in charge of the real estate department of the Clinchfield Coal Corporation. He succeeds **E. Q. Trowbridge**, who has entered military service.

**Samuel Jones**, formerly mine foreman at McIntyre, Penn., for the Jefferson & Clearfield Coal and Iron Co., has resigned his position as mine foreman for the Morrellville Coal Mining Co., Johnstown, Penn., to accept the superintendency of the Union Central Coal Co., Inc., Butler, Penn. Mr. Jones will assume his new duties on Nov. 1.

**Richard D. Maize**, mine inspector of the Fifth Bituminous district at Uniontown, Penn., has been granted a leave of absence by the Chief of the Department of Mines of Pennsylvania, to enter the army. Mr. Maize will enter the University of Pittsburgh for intensive training. **Silas C. Hall** of Van Voorhis, has been appointed temporary inspector.

**Wade H. Horn**, formerly chief engineer of the Raleigh Coal and Coke Co., at Raleigh, W. Va., and at present right-hand man to Frank A. Ray, consulting mining engineer, Columbus, Ohio, has accepted a position with the Wisconsin Steel Co., Benham, Harlan County, Kentucky. The company contemplates the doubling of its present coal output, and Mr. Horn will be in charge of the new construction work.

## Obituary

**Charles G. Roebling**, president of the John A. Roebling's Sons, Co., Trenton, N. J., manufacturer of wire rope for coal mining, died on Oct. 5.

**W. H. Christ**, a prominent mining engineer and former official of C. M. Dodson & Co. at Beaver Brook, Penn., died at his home in Mahanoy City recently.

**Donald B. Earwood**, store manager of the Ingram Branch Coal Co., died Oct. 22 of pneumonia, following an attack of influenza, at Beckley, W. Va. Mr. Earwood was sick for only a week.

**W. W. Harding**, superintendent of the No. 9 works of the United States Coal and Coke Co., died Oct. 22 of influenza. Mr. Harding had been for ten years with the United States company and was one of the most efficient mining men in the region. He was buried at Wilkinsburg, Penn.

**J. M. Guthrie**, of Indiana, Penn., died Oct. 19 after a short illness of pneumonia. He was the pioneer coal operator of Indiana County and was instrumental in opening the Graceton, Tearing Run and other mines in the county. He was the builder of the first coke ovens in this section. He was aged 87 years.

**Frank I. Parker**, of the Cutler-Hammer Manufacturing Co., Milwaukee, Wis., died at his home in Milwaukee on Oct. 18, at the age of 36 years. His death was due to pneumonia contracted through Spanish influenza. Mr. Parker was graduated from the University of Wisconsin in June, 1906, and in July became engineer in charge of production in the magnet and clutch department of the Cutler-Hammer company. Since 1911 Mr. Parker has had charge of sales service work on clutch department products. He was made an associate member of the American Institute of Electric Engineers in 1910 and in 1913 became a member. He is survived by his widow and one child.

## Industrial News

**Columbus, Ohio**—The Columbus city government has purchased a coal conveyor for the municipal coal yard from the Columbus Conveyor Co., for $3875.

**Cleveland, Ohio**—The Lakewood Engineering Co. announces the opening of offices in New York City, at 111 Broadway, in charge of George S. Hedge, district manager. The company specializes in construction plant and industrial haulage.

**New York, N. Y.**—Morris & Co., of Chicago, Ill., recently placed an order with the Locomotive Pulverized Fuel Co., of New York, for the installation of a complete "Lopulco" system for crushing, drying, pulverizing and burning coal. The equipment is to be installed at the company's steam power plant at Oklahoma City, Okla., and native coals and Texas lignite will be used.

**Cleveland, Ohio**—The Barber-Greene Co. announces the strengthening of its organization as follows: F. E. Smith, chief engineer, formerly of the Engineering Department of the Stephens-Adamson Manufacturing Co., of the Granby Mining and Smelting Co., and the American Zinc and Chemical Co. George C. Sanford, superintendent, formerly of the Elevator Supplies Co., and of the Otis Elevator Co.

**Washington, D. C.**—Despite speed at which coal is being produced in this country, and the increasing danger of accidents, there was a reduction of 121 fatalities the first six months of this year as against the same period last year. Figures issued by the Federal Bureau of Mines show that fatalities during the first six months last year totaled 1298. During the same period this year the number dropped to 1177.

**Wallace, Idaho**—Robert N. Bell, state mine inspector, who recently inspected the Teton Valley Coal property, stated that the development work being carried on will insure hereafter the whole upper Snake River valley against future coal famines and will make coal prices considerably lower in this section. As soon as a ten-mile spur track is completed the mine will be able to supply the entire southeastern section of Idaho.

**St. Louis, Mo.**—The Walter A. Zelnicker Supply Co. announces the appointment of R. H. Wilson as assistant to the president, with office at St. Louis. Mr. Wilson, who has been with the company for years, latterly as Houston representative, is succeeded there by E. O. Griffin, well known in Southwestern railroad circles for the past twenty years as storekeeper and assistant general manager of the International & Great Northern, and more recently as assistant to the President of the St. Louis Southwestern in charge of purchases.

**Toledo, Ohio**—Because of the prevalence of the influenza epidemic lake shipments from Ohio and West Virginia have been slightly reduced. This is shown by the record of the tonnage handled by the docks at Toledo. For the week ending Oct. 19 Hocking Valley docks loaded 151,780 tons, as compared with 206,508 tons the previous week, making a total of 4,234,433

tons for the season. The Toledo & Ohio Central docks during the same week loaded 89,000 tons, as compared with 91,000 tons the previous week, making a total of 1,979,000 tons for the season.

**Springfield, Ill.**—Governor Lowden of Illinois has appointed a mine investigation committee to pass upon proposed amendments to the state mining laws which are to be offered to the next General Assembly. The first meeting was held this week at Springfield, at which Thomas A. Jeremiah, of Williamsville, was chosen chairman and Charles M. Jones, of Marion, secretary. Meetings will be held at intervals and miners and operators will be summoned to give their views on proposed changes in the law. A number of recommendations will be made by the State Mining Board.

**Charleston, W. Va.**—Casualties in the mines of West Virginia during September reached a total of 37, by far the largest proportion of such deaths being due to falling roof and slate or coal, no less than 20 men meeting their death in such a manner. Mine cars within the mines killed five and a motor one. Two were electrocuted, two died in inside explosions and one was killed by a mining machine. Outside the mines there were only six deaths—four being killed by mine cars, one by a motor and one under the head of miscellaneous. The heaviest death rate was in McDowell County—8. Of the 37 men killed, 24 were Americans and 13 were foreigners.

**Columbus, Ohio**—A general advisory committee to have charge of production of coal in Ohio has been named by James H. Pritchard, production manager for southern Ohio, and J. J. Roby, production manager for eastern and northern Ohio. These two production managers felt the need of a general committee in order to coördinate the production campaign which is to be started soon. The committee consists of three miners and three operators. For the operators G. C. Weitzell, resident vice president of the Pittsburgh Coal Co.; A. A. Augustus, president of the Cambridge Collieries Co., of Cleveland, and S. H. Robbins, president of the Pittsburgh Vein Operators' Association, Cleveland.

**New York, N. Y.**—The Anthracite Committee of the Fuel Administration, composed of J. B. Dickson of Dickson & Eddy of this city; S. D. Warriner of the Lehigh Coal and Navigation Co., and W. J. Richards of the Philadelphia and Reading Co., have about completed arrangements governing distribution in the United States and Canada of virtually every ton of domestic anthracite which can be supplied to consumers up to next April. This includes all coal that can be produced between now and then. Since last April the committee has controlled and distributed some 45,000,000 tons of anthracite, in accordance with the allotment as announced by the committee on May 29.

**Uniontown, Penn.**—Activity in water transportation down the Monongahela River as the Clairton byproduct plant increases its capacity for coal has resulted in several steamers changing hands, and within a short time new boats will be put in the river service. The Carnegie Steel Co. has purchased the steamer "Monitor" from the Diamond Coal and Coke Co. for $70,000 and has added it to the regular towing fleet. Within a short time the "W. H. Clingerman," the new stern wheeler being built in Pittsburgh, will be placed in service. Captain John F. Klein has sold the steamer "E. F. Jackson" and a fleet of 21 barges to the Lyons Coal Co. at Fairmont, W. Va. Coal will be towed from the company's operation there to the Pittsburgh harbor. The consideration was $27,000.

# MARKET DEPARTMENT

## *Weekly Review*

### *Coal Production Affected by Influenza Epidemic—Output Still Ahead of Last Year—Need for Economy—Domestic Sizes of Anthracite Scarce—Small Sizes Plentiful—No Prospect of Bituminous Shortage.*

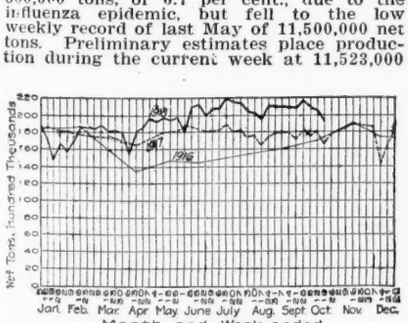
**BOTH anthracite and bituminous coal suffered a setback during the week ended Oct. 19, owing to the epidemic of influenza in the mining regions. The 11,523,000 net tons of soft coal produced in the week under review, though 800,000 net tons behind the output of the week ended Oct. 12, exceeded by 1,300,000 net tons the production during the same period of 1917. Reports show that influenza caused a decrease in the shipments of soft coal from all fields except western Pennsylvania. The epidemic has not helped the anthracite situation. Production of hard coal during the week ended Oct. 19 totaled 1,715,000 net tons compared with 1,955,000 net tons the preceding week. The total output of anthracite from April 1 to date is estimated at 57,573,000 net tons, as against 56,736,000 net tons for the same period of 1917.**

**Though the country as a whole is rather well supplied with bituminous coal, the necessity still exists for the exercise of the strictest economy. The quantity of anthracite distributed so far this year to those sections which are permitted to burn hard coal is greater than in normal years. The demand for domestic sizes is strong. Prepared sizes of anthracite, such as egg, stove and chestnut, are scarce. Many consumers have been advised to purchase the smaller sizes, and mix it with the larger grades. The small sizes of anthracite are plentiful and in order to move some of their surplus stocks of these coals several shippers have been cutting the prices somewhat.**

**Summed up concretely, the coal situation can be said to be generally satisfactory. There is no prospect of a serious shortage in bituminous, and the belief is expressed that domestic consumers will receive their share of anthracite before November closes.**

#### WEEKLY COAL PRODUCTION

Production of bituminous coal for the week ended Oct. 19 not only decreased 800,000 tons, or 6.7 per cent., due to the influenza epidemic, but fell to the low weekly record of last May of 11,500,000 net tons. Preliminary estimates place production during the current week at 11,523,000




net tons, and while 800,000 net tons below the week of Oct. 12, exceeded production during the corresponding week of 1917 by 1,300,000 net tons, or 12.3 per cent. The average production per working day is estimated at 1,920,000 net tons, during the week ended Oct. 19, as compared with 2,056,000 net tons during the week preceding, and as against 1,702,000 net tons produced during the week ended Oct. 19, 1917. The average daily production for the coal year to date is estimated at 1,992,000 net tons, which is slightly below requirements, and in order to make up the deficit it is necessary that daily production during the balance of the coal year should be equivalent to 2,039,000 net tons, or 2.4 per cent. in excess of the average daily production to date. Carriers' reports show that the influenza epidemic caused a decrease in shipments from all fields with the exception of western Pennsylvania.

The influenza epidemic also caused considerable loss in the anthracite fields, and production during the week ended Oct. 19, estimated at 1,715,000 net tons, is a decrease of 240,000 net tons, or 12.3 per cent. compared with the week of Oct. 5. The daily average during the current week is estimated at 286,000 net tons, as compared with 326,000 net tons during the week of Oct. 12, and as against 335,000 net tons during the coal year to date. Total production for the period Apr. 1 to date is estimated at 57,373,000 net tons compared with 56,736,000 net tons for the same period of 1917.

Production of beehive coke in the United States during the week ended Oct. 19, is estimated at 575,000 net tons, a decrease of 25,000 net tons or 4 per cent. compared with the week preceding. The average daily production is estimated at 96,000 net tons as against 100,000 net tons during the week ended Oct. 12.

The operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke during the week ended Oct. 19 at 360,488 net tons, and the operation of their plants at 75.1 per cent. of full time as compared with 77 per cent. during the week ended Oct. 12. In addition to labor shortage which was, as in previous weeks, the limiting factor, shortage of coke cars caused a loss of 2.5 per cent. of full time, as against 0.9 per cent. during the week preceding.

Byproduct coke plants of the United States were operated during the week ended Oct. 19 at 91 per cent. of their full time as compared with 91.3 per cent. during the week preceding. Of the total loss of 9 per cent. 1.3 per cent. was due to lack of byproduct coal, 0.6 per cent. to shortage of labor, 5.7 per cent. to repairs to plants and 1.4 per cent. to other causes.

Material improvement was reported during the week in the Maryland, Pennsylvania and Tennessee plants. In Maryland the operators attribute the improvement to better labor conditions, in Pennsylvania, to other causes, and in Tennessee, to repaired plants. Operators reporting a noticeable decline in production during the week ended Oct. 19 compared with the week preceding were those in Kentucky, Minnesota, New Jersey and Ohio. In Kentucky and Ohio, the limiting factor was repairs to plants, in Minnesota, other causes, while in New Jersey, the lack of byproduct coal curtailed production.

### BUSINESS OPINIONS

**Marshall Field & Co.**—Current distribution of dry goods is slightly in excess of the corresponding week of 1917. The volume of road sales for both immediate and spring delivery is well ahead of the same period last year. There was a falling-off in the number of merchants in the market. Collections continue good.

**American Wool and Cotton Reporter**—Release of wool for civilian purposes is the subject of some discussion in the wool trade. It is not likely, however, that any wool will be released before the first of the year, for it is understood that the Government wants to be absolutely sure that there is plenty on hand for its needs before any is sold to the manufacturers for civilian purposes. No great change has taken place in the cotton market during the week under review. Brokers are not looking for any big drop in the market.

**Dry Goods Economist**—The order issued by the Priorities Division of the War Industries Board, limiting the production of silk goods of all classes to a maximum of 50 per cent. of the average quantity produced in 1915, 1916 and 1917, has caused no serious comment, it being recognized that for months past the output has not exceeded 60 per cent of the average of the last three years in any line of silk goods and that in many lines it has been as low as 40 per cent. The order is effective as of Dec. 1, and is to continue in force for six months.

**Bradstreet's**—Maintain production and speed it if possible, is the order of the day in the iron and steel line, and such essentials as plates and sheets are in great demand, while mills making barbed wire for export to France are oversold; but on the other hand, calls for pig iron have abated somewhat. Besides buying heavily of oats, the government is expected to soon give out large orders for woolens, and contracts for auto trucks, calling for the expenditure of $132,000,000, practically have been placed. Shortage of labor is as marked as ever, in some sections more acute, in fact, and even the most essential plants complain of the frequency of the turnover, but from some quarters come intimations that munition and powder plants may soon provide relief in this respect.

**The Iron Age**—The quieting effect of peace talk has been noticed particularly in the markets for pig iron, scrap and ferro-alloys, all of which have until lately shown more freedom of action than finished steel. Some pig iron sellers are protecting themselves by the proviso that unless changed by Government action the present prices shall apply on all iron delivered under the contract. Thus if the war ended suddenly and the controlled price policy were terminated, the prices now prevailing would continue to be the basis of settlement. Consumers have not taken kindly to these riders in the case of allocated iron. The distribution of 137,000 tons of barbed wire to the Allies—65,000 tons to Italy, 50,000 tons to France and 22,000 tons to Great Britain—and the setting aside of 60,000 tons for the United States have tied up most of the wire capacity for some time.

## Atlantic Seaboard

### BOSTON

**Chief factors of situation are influenza epidemic and volume shipments overseas. Hampton Roads dumpings for New England continue light. Baltimore clearances also relatively few. New York piers slow lumping because of sickness. All-rail receipts average about as last week, but less regular, due to local conditions. Wagon coal practically ceased moving to this territory, at least through Fuel Administration channels. Less heard of coal offered for delivery extending over twelve months period. Anthracite shipments by water improve slightly. "Storrow anthracite" coming mostly from "independents" is less eagerly sought, although there are still many holes.**

**Bituminous**—New England is thoroughly well stocked with steam grades, but there is yet a little doubt whether current requirements will be allowed to come forward in sufficient tonnages. The war program so far as industrial plants are concerned shows no sign of easing off, and it is only because of the tremendous effort in July and August to "stuff" New England that the situation here is so quiet in a coal way. The cost of all-rail deliveries from Central Pennsylvania at practically every point in this territory is less than any coal by water, and that of course restricts current buying of water-borne coal to a minimum. All buyers are taking their commitments, provided the fuel authorities leave the way open, and it is only this possibility of interference always hanging over us that today gives occasion for any anxiety as to the coming winter.

A number of lake-built steamers of around 2500 to 3000 tons have now been substituted for the larger colliers that were taken for transatlantic carrying. In a more restricted sense, therefore, contract coal is coming forward from Hampton Roads. Deliveries are less regular, and generally the use of smaller steamers will mean a distinct curtailment in receipts at this end. Dumpings for New England have fallen off materially and from the standpoint of the distributor inland it is well they have. To place any more coal than is now being absorbed, and still follow the directions of the various state administrators, would be at least embarrassing to the wholesaler. Average dispatch at the Norfolk and Newport News piers is now from three to four days, a marked improvement over conditions a month ago.

Baltimore loadings for New England are also very light. Line and offshore requirements have stiffened the past fortnight, and these together with the slack in production and the disinclination of shippers to risk sending coal to Boston for distribution have had their effect. Except for railroad purposes we are likely to get less coal from Baltimore this winter, although it is possible that a new blocking out of territory by the fuel authorities at Washington will make a difference in this.

At New York the loading piers are still seriously handicapped by the lack of men to handle coal as it arrives. At times there has been only a corporal's guard to dump long lines of cars, and meanwhile bottoms have waited and demurrage has accrued. In some cases barges have waited in excess of two weeks and have then been taken away to load at other piers. At Port Reading manifestly too much has been attempted. In the opinion of several who are competent to judge, the Railroad Administration will be forced to resume sending P. & R. barges to Philadelphia, at least in part, unless the use of valuable transportation is to be wasted.

For the seven days ending Oct. 24 the receipts of commercial bituminous at the five New England gateways averaged 383 cars. The movement of railroad fuel has again dropped off to about 150 cars daily, so that the total movement of bituminous is now down to about 535 cars per day, or only slightly less than a week ago. Daily receipts have been much less even, however, due doubtless to suspensions local in the mining districts.

In the Central Pennsylvania district wagon-coal is still being distributed by the Fuel Administration, but calls are sufficient from other sections to take care of current receipts without sending much to New England. In fact, the receipts here of wagon coal through Administration channels have practically ceased. There has been a sentiment here in some quarters none too cordial to the effort made by the District Representative to clear up the box-car situation, but there was enough support at the time it was most needed. The cars came forward, they were placed, and the billing was most carefully supervised. The result is an end to price-monkeying on wagon coal and for his courage and initiative in carrying through a difficult program Mr. Cameron deserves much praise.

This week there is less talk of contracts being offered for delivery over a twelve months period. So far as we are advised there has been practically no business closed on this basis.

The local fuel authorities are again busily revising their embargo lists to conform to the most recent modification from Washington of the rule covering permissible reserves. In Maine non-essentials are now allowed to have 90 days supply, where a few weeks ago, had the rule been strictly adhered to, a number of plants would have been practically put out of business.

**Anthracite**—Shipments of domestic sizes have increased slightly by water the past week, although the comparison is with the first three weeks of the month when New York loadings had dropped way off. As it is, a large proportion of the cargoes coming forward have broken and pea sizes, with only small doles of either stove or chestnut. The Boston Fuel Committee is expected to issue an order directing dealers to deliver with each order for domestic sizes some stipulated proportion of pea. Rail receipts at the five New England gateways are practically on the same footing as a week ago, an average of 400 cars daily, domestic sizes.

It develops that most of the free "Storrow anthracite" coming forward is from "independent" operators, and therefore carrying the 75c. additional. As rural dealers come to realize this they are inclined to rely more upon their regular sources of supply, and the result is that this emergency supply is somewhat less sought after. This is quite likely to change, however, with the approach of more seasonable weather.

### NEW YORK

**Influenza epidemic cuts production at the rate of nearly a quarter million tons each week. New England wants more hard coal, but boats find it difficult to get cargoes. Physicians are sent into the coal fields to fight malady. Bituminous market in good shape. Manufacturers are well stocked. Bunker situation serious.**

**Anthracite**—Receipts of anthracite here have been further reduced because of the influenza scourge throughout the coal regions. Production is being curtailed at the rate of nearly a quarter million tons weekly in spite of the efforts of the Fuel Administration. The epidemic has also left its imprint on the local situation, workers at the loading docks having in some cases been reduced to one-fifth of their normal number and the local dealers, already short of help, being further hindered in their deliveries.

Dumpings at the local piers for the seven-day period ending Oct. 25 were 5597 cars as compared with 6050 cars the previous seven days, a decrease of 453 cars. With the exception of the week ending Oct. 11 this was the lightest in several months. Should similar conditions continue for any length of time, they will have a serious effect upon the program of the Fuel Administration and dealers to give every consumer at least part of his winter supply of fuel before cold weather sets in.

Not only is New York feeling the effects of the curtailed production, but towns along Long Island Sound and as far north as Maine which receive their coal in small schooners from this port are hard-hit. The lack of fuel at this time means considerable to these small towns, many of which are so far removed from a railroad that if coal could be shipped by rail it would mean a long haul by wagon to the place of consumption.

The State Fuel Administration is advising consumers to mix the small anthracite sizes with those ordinarily used, telling them that they cannot get a full supply of stove and chestnut for the reason that only 41 per cent. of the anthracite mined comes through the screens in these two sizes.

The local market is being crowded with the smaller sizes from pea down to and including No. 4 buckwheat and culm, while the prepared coals are becoming scarcer and harder to get. There is scarcely any egg, stove or chestnut in the market, orders for these two sizes being placed far ahead so that the dealer anxious to find a loose lot finds it difficult to obtain it.

Pea coal is plentiful, but the demand is not heavy. Buckwheat and the smaller sizes are nearly a drug on the market and various shippers have been cutting prices slightly in order to move their surplus. Retail dealers are not anxious at this time to take any more of the small coals than they have a market for, hence the overstocks in the hands of the shippers and producers who have no place to store it.

Retail dealers are being hard pressed. They cannot obtain all the coal they want and on the other hand if they could they would not have the help to take care of it. Between the lack of labor and the influenza epidemic raging in the city, the dealers are in a quandary, but hope to be able to give all of their customers some coal between now and the first of November.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

| | Circular | Individual | | Circular | Individual |
|---|---|---|---|---|---|
| Broken | $6.75 | $7.50 | Buck | $5.10 | $5.90 |
| Egg | 6.65 | 7.40 | Rice | 4.65 | 5.10 |
| Stove | 6.90 | 7.65 | Barley | 4.15 | 4.30 |
| Chestnut | 7.00 | 7.75 | Boiler | 4.60 | |
| Pea | 5.50 | 6.25 | | | |

**Bituminous**—At this port receipts show a decided decrease, but loadings based upon the tonnage received show a better average than existed a couple of months ago, and this in view of the fact that the working forces at the various docks are greatly depleted because of the epidemic, some of the docks having about one-fifth of their usual working forces on hand.

The dumpings at the local docks for the week ended Oct. 25 were 6430 cars, a decrease of only 13 cars as compared with the previous week, but, with the exception of the week ended Oct. 11, the smallest week in several months.

Locally the situation as regards commercial coal is not serious. There is plenty for all, as most owners of essential plants are well stocked and under the new regulations regarding the storage of coal all

others are now permitted to carry larger stocks than for some time past. Large consumers are not now inclined to add to their stocks, preferring, presumably, to take chances of picking up some coals at lower prices later on.

That the situation in New England is much easier is evidenced by the presence here of many empty bottoms used in that trade. Empty boats are to be seen everywhere. This situation is due as much to the lack of anthracite as to the lack of orders for bituminous for points along the Sound and the New England waterfront.

Large producers and shippers of the better grades have a steady call for their product, and some of them claim to be behind on their contracts.

The bunkering situation is not encouraging to shipping interests. Supplies are short and coal is not being received in sufficient quantities to guarantee continuous loading should there be any transportation interruption. The Pocahontas district has been hard-hit by the epidemic, the railroads as well as the mines being the sufferers.

Current quotations, based on Government prices at the mines, net ton f.o.b., tidewater, at the lower ports, are as follows:

| | Mine Gross | f.o.b. N. Y. Gross |
|---|---|---|
| Central Pennsylvania: | | |
| Mine-Run, prepared or slack | $3.30 | $5.45 |
| Upper Potomac, Cumberland, and Piedmont Fields: | | |
| Run-of Mine | 3.08 | 5.23 |
| Prepared | 3.36 | 5.51 |
| Slack | 2.80 | 4.95 |

Quotations at the upper ports are 5c. higher.

### PHILADELPHIA

**Anthracite receipts short. Illness cuts production 25 per cent. Companies, however, promise to meet allotments. Water yards being filled. Stove and nut still in heaviest demand. Steam coal quiet. Bituminous coal in fair supply. Decreasing production beginning to be felt. Scarcity of gas coal.**

**Anthracite**—This city has probably received less coal during the past ten days than during any similar period of the present coal year. At the office of the largest operating company it was learned that their production is at least 25 per cent. short owing to the prevalent illness among the miners, and that the current shipments are practically all being consigned to tide points and to the western market. Another one of the big companies reports a labor shortage of 20 per cent., with by far the larger proportion of the production also going to tide. At the offices of this company we learned they were giving their Philadelphia trade, located on the P. & R. tracks, positive assurance that they would receive every ton of their quota based on the 1916-17 allotment, and that it was expected to increase same about 20 per cent.

While the trade as well as the public is growing more impatient, yet we can only report that all signs indicate there is no real cause for alarm. Philadelphia will surely be supplied beyond all fear of suffering, providing reasonable economy and wise distribution especially by the dealers themselves, is shown. We are also firmly convinced that the heavy tonnage will not begin to arrive until cold weather sets in. The dealers dread the prospect of being responsible for its delivery to the consumer during the winter months, with the accompanying bad weather. It will be remembered that the local fuel administrator promised to have the suburban dealers supplied early because of the more difficult deliveries in the outlying sections of the city, but it begins to look as if they too would have to wait. Of course, the principal cause of the retailer's concern regarding these late shipments is the labor situation, which is certain to be more difficult to control as the season advances.

Locally the only dealers who have any stocks to speak of are those with water yards. The shippers who were responsible for their supply have all along tried to dispose of their obligations to them while navigation is open. When prices advance these dealers are wondering if the fuel authorities will allow them to charge the new rates for the coal on hand.

There are no stocks to speak of. The supply of egg that a few dealers had accumulated is rapidly disappearing. The same is true of pea coal, but it had been stored in larger quantities. Stove and chestnut is in as much demand as ever and is in even shorter supply than at any time during the past month.

Attention has recently been directed to the peddler trade, who it is estimated supply about 15% of the city's domestic coal requirements. Although efforts are being made by the fuel administrator to protect the small buyers who are usually supplied with a bucketful at a time at a greatly increased cost to the dealer, the prices fixed under the present ruling will cost small buyers at the rate of $19.10 for chestnut and $16.70 for pea coal. These are the sizes handled almost exclusively by the peddlers. Stores handling coal by the bucket and bag are compelled to sell at 3c. less than the peddlers, the prices being 19c. and 16c. for nut and pea respectively in bags, and 13c. and 11c. in 10-quart buckets. The difference in price is due to coal being handled as a side line by storekeepers, and they are thus not put to the same expense as the peddlers.

The steam coals still continue to be very quiet. While there is no particular heaviness with buckwheat, yet on the other hand users of this size are doing very little urging for increased shipments. Those concerns who have been permitted to stock this coal have ample piles, and while they do not refuse additional shipments, in many cases it is for the reason that they do not want to hurt their case when the pinch comes this winter. Rice is quite plentiful and some of the larger companies continue to place a light tonnage in the storage yards near the region. The same can also be said of barley. Culm is out of the market.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

| | Line | Tide | | Line | Tide |
|---|---|---|---|---|---|
| Broken | $4.90 | $6.25 | Buckwheat | $3.40 | $4.45 |
| Egg | 4.80 | 6.15 | Rice | 2.90 | 3.80 |
| Stove | 5.05 | 6.40 | Boiler | 2.70 | 3.70 |
| Nut | 5.15 | 6.50 | Barley | 2.40 | 3.30 |
| Pea | 3.75 | 5.00 | Culm | 1.25 | 2.15 |

**Bituminous.**—While the market continues to be fairly well taken care of, there is beginning to be some evidence of a falling production. Many operators report the influenza epidemic as reaching its height in the western part of the state now, and it is thought by the end of the week there will be a somewhat serious shortage. One operator advised us that 50 per cent. of his men are out on account of the illness. The miners are also somewhat restive due to their wage demand having been denied by the National Administration.

In this market there is a particular shortage of gas coal, which is principally used by the steel plants in and about the city. Some of the largest plants have only a five-day supply ahead. Much of this coal comes from the Greensburg district, and the statement is made that relief cannot be expected from that quarter for some time on account of the illness now prevalent there.

### BALTIMORE

**Influenza continues to play havoc with production and distribution of soft coal. Demand growing steadily as consumers run low on their stored stocks. Improvement in grade of shipments. New order disturbs jobbers. Hard coal situation unimproved.**

**Bituminous**—Influenza still holds the upper hand in this section. Not only do mine reports show efficiency cut from 30 to 50 per cent. by the disease, but the Baltimore & Ohio R.R. is seriously crippled and has been shipping less than half of its normal coal tonnage. In distributing the coal coming through there are complications due to inadequate pier handling forces.

The demand is growing steadily, as the stored stocks of both non-essential and essential industries run below their permissible 15- and 30-day allotment. Several industries that had been cut off the delivery list for weeks because they had stored from 60 to 120 days ahead before the Fuel Administration's limitation order are now back in the market for more coal.

A feature of interest just now is the steady improvement in some of the box-car coal coming through. For such coal consumers have been entirely willing to pay the added price on box-car movement and for unloading. The old jobbing trade is somewhat disturbed over a new order from the National Fuel Administration which says that all coal requisitioned on the order of a state administrator shall at his request be invoiced to a licensee named by the purchaser, unless the producer prefers that it be invoiced directly to the purchaser. Such licensee named by the purchaser may, if the coal is invoiced to him, charge a purchasing agent's commission subject to the rules and regulations governing licensees. Purchasing agents here feel that this may result in mines dealing direct with many of the best customers they have had for years, and for whom they have at times recently been forced to appeal to the fuel administrator to get requisitioned coal to cover their contracts.

**Anthracite**—Little or no improvement is noted in the hard-coal situation. Coal is now coming through at the rate of about 50,000 tons a month, while there still remains about one-fourth of the homes of the city without coal. Some dealers here are still giving two-thirds on orders when they get coal, while others deliver in one- and two-ton lots. Probably 30,000 homes will still be without coal when cold weather arrives. The receipts here since last April have not only fallen below the allotment for the city, but have fallen below the receipts for the same period of last year. This spring, also, the city started off with a deficit of probably 75,000 tons, as against the yard and home holdover supplies of the previous spring. The local fuel administrator is now advising householders to burn soft coal. The trade also faces the fact that just now a large proportion of the coal coming in is of sizes which are unsuited to their household trade.

## Lake Markets

### PITTSBURGH

**Price shading in some Ohio districts, but wider distribution now allowed. Heavy pressure on Pittsburgh district for lake coal, particularly gas and by-product. Serious effects of influenza.**

The market for coal in the Hocking, Goshen and some other Ohio fields has been soft, and at times there has been considerable price shading. Some coal allowed a Government limit of $2.90 has sold down to the general standard of $2.35. A part of this congestion arose from the recent recasting of zone limits, whereby more territory was given to Indiana and Illinois, this being followed lately by a curtailment in the amount of coal that could be received for lake movement, on account of vessel and dock conditions. The situation is likely to be relieved, and a broader market furnished for the coal that is in excess of demand, by the recent opening of the Black Rock, N. Y., gateway, giving Ohio coal a wider field.

As to the Pittsburgh district there is no relaxation in the pressure for lake coal, as gas and byproduct coals are given precedence in the matter of lake carriage, and such coal must come chiefly from this district. As noted a fortnight ago, the coal distributor has been permitted to divert 200 carloads additional weekly to retail dealers, and lake shipments are at a correspondingly lower rate; but hopes are entertained of shipping 300,000 tons a week to the lakes from the district unless production is seriously curtailed.

Influenza has been affecting production of coal more than a week ago, some mines being seriously affected while others are almost free. The influenza is much worse in the Connellsville region than in the Pittsburgh district. No opinion is hazarded as to whether the epidemic has passed its crest, as it has a way of affecting large centers of population first and then working out into regions where population is not so dense.

There are no market transactions in Pittsburgh coal as all coal is moving under contract or allocation, but there has been some activity in coal from a few Ohio districts. The market remains quotable for the district at the set limits: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, with 15c. brokerage allowed to be charged in addition by regular brokers.

### BUFFALO

**Bituminous more plenty. Some shippers say the market is pretty flat. Consumers do not seem to be afraid of a serious shortage right away. Influenza affects mining. Anthracite very short locally.**

**Bituminous**—The trade is easier than it has been in a long time. There is still complaint of coal being ordered to various consuming plants, some of them here, faster than it can be unloaded, so that while the consumers that the shpipers are trying to serve are going without coal the concerns that do get it are paying demurrage. What the shippers hope for now is coal enough before long so that no further commandeering will be practiced. At present the railroads are taking large amounts.

In general the jobbing interests are selling only small amounts of coal, though a few manage to get near enough to the operators to obtain a pretty good tonnage. The jobbers generally agree that the zonal authorities are still undermining them, and

that if the present method of distributing the coal continues long the business of the middleman will mostly be transferred to the zones.

All reports agree that the active manufacturing plants the country over are pretty well supplied with coal, so that they can afford to buy soaringly for awhile and most of them seem to be doing so. Slack is especially plenty and only lump is at all scarce. Prices continue on the basis of the Government figures, $4.65 for Allegheny Valley thin vein, $4.45 for Pittsburgh lump, $4.20 for Pittsburgh mine-run and slack, $5.85 for smithing and smokeless and $5.60 to $6.10 for cannel, all per net ton, f.o.b. Buffalo.

**Anthracite**—The complaints of no coal are heard about as much as ever. They are met as before by statements from the fuel authorities that they are taking care of every emergency case, and that the winter's supply will be forthcoming before it is needed. As a rule the city anthracite distributors are declaring that they have kept up former delivery amounts, but their neighbors have not. It will all be easy if the shipments to the lakes are turned in on the city a short time after the lakes close early in December. The influenza is cutting down the production and may make a serious difference with the movement if it continues. It has not abated to any extent yet here.

Shipments by lake are about as formerly, being for the week 107,633 net tons, of which 57,400 tons cleared for Duluth and Superior, 15,000 tons for Milwaukee, 17,233 tons for Chicago, 5500 tons for Port Arthur, 3000 tons for Gladstone, 2700 tons for Fort William, 2500 tons for the Sault, 2400 tons for Manitowoc, 1000 tons for Depere and 900 tons for Lake Linden.

Freight rates remain strong at $1 to Sault and Depere, 48 to 75c. to Lake Linden, 60 to 65c. to Chicago, 55c. to Milwaukee, 50c. to Manitowoc, 48c. to Duluth, Port Arthur and Fort William.

## CLEVELAND

**Bituminous for the lake trade is tapering off somewhat—though October shipments will come close to exceeding the schedule by 1,000,000 tons—while the receipts for domestic and industrial consumption have gained in proportion. Domestic orders are on the decline, indicating the well-coaled condition of the district. Improved car supply is aiding in offsetting lost production attributable to influenza.**

**Bituminous**—Receipts for the industrial and domestic trade, as well as for dumping for the Northwest, are holding up remarkably well in the face of the epidemic of influenza that is sweeping the No. 8 district. While some mines have been forced to suspend entirely, others have scarcely been affected. On the whole, the inroads have been more mild than expected, though many operators fear the crest has not yet been reached. More serious inroads seem to have been made on the train crews of the roads supplying southern Ohio mines. Car supply, despite this handicap, is averaging 85 per cent. or better. The real truth of the labor situation is almost impossible to determine because of the sick lists.

The movement of bituminous into Cleveland and northern Ohio for industrial and domestic consumption is slightly heavier, at the expense of the lake trade. For the first time, a falling off in new business is noted by domestic dealers. Their increased receipts, however, are more than taken up by deferred business. Industrial stockpiles, which only in rare instances are below the 30-day mark and run as high as 120 days in instances, continue to be added to, and advantage is being taken of the extension of stocking limits. This is most comforting to operators, who point out that the one factor that will cut off spot shipments this winter—extreme cold paralyzing the railroads—will at the same time increase consumption out of all normal proportion. Some fair-sized lake shippers of coal, who assert they have been most diligent in heeding the Federal Fuel Administration's admonitions in regard to contracting, assert that all but 25 per cent. of their contract business will expire with the closing of navigation on the Great Lakes the middle of December. While they expect industrial and domestic demands will take up whatever slack results, they predict that many wagon mines will be compelled to close. A slight surplus of coal is looked for by some interests unless much more than the expected tonnage released by the lake trade is diverted toward the east. The report of the Pittsburgh Vein Operators' Association of Ohio on car supply to its members for the week ended Oct. 12 places the shortage of cars in that week at an average of 28.41 per cent., and the lost production chalked up to this factor as 119,100 tons. The average car shortage in the preceding week was 15.49 per cent. The diversion of all B. & O. cars to the Fairmont region for the last half of the week is blamed for the extremely poor showing. Shipments in the week ended Oct. 12 totalled 5,419 cars as against 6,103 in the week preceding.

**Anthracite**—Receipts continue to drag along at from 150 to 200 cars a week, about 25 per cent. of what ordinarily could be disposed of at this time. Upper lake dock interests complain that to Oct. 15 they have received only 1,325,000 tons of anthracite, compared with 1,950,000 tons to the same date last year.

**Lake Trade**—Unless shipments of bituminous in the last week of the month fall down unexpectedly, the Northwest will have been given fully 4,500,000 tons in October, or 1,000,000 more than the Federal Fuel Administration called for. To Oct. 15 the total bituminous loaded at lower lake ports for the Northwest—exclusive of vessel fuel—is estimated at 23,050,000 tons. From Oct. 1 to 21 the loading is placed at 3,450,000 tons. Receipts at the docks in the last 10 days of the month slumped somewhat owing to the influenza epidemic. Instead of fearing that the Northwest will not get its 28,000,000 tons of bituminous this season, the Great Lakes vessel men in charge of the downward movement of grain in November and the first half of December are hoping coal operators will purposely slow up shipments in order to leave some coal for ballast in December. Barring the slight recession the past few days, the October movement is proving the fastest of the season, and some operators predict that the high mark set in August, when 4,996,929 tons of both cargo and bunker coal were handled over Lake Erie car dumpers, will be broken.

## DETROIT

**Reserve piles strengthen position of numerous industrial consumers. Fine weather in October brings relief to many domestic consumers. Lake shipments heavy.**

**Bituminous**—Though there is less coal available in the Detroit market than a few weeks ago, the demand from consumers of steam coal is apparently not urgent. Jobbers explain this as being an indication of successful accumulation of large storage piles by many of the great industrial and manufacturing plants of the city. Profiting from their experience of last year, many of the consumers of steam coal, according to the jobbers, have been gradually building up reserves through a large part of the summer. Some of these consumers have on hand so abundant a supply that they are said to be meeting their present requirements from storage stocks rather than by direct shipments. By following this course a number of manufacturing plants are able to avoid using the coal now coming to Detroit from Illinois and Indiana, which, in the opinion of some of the buyers, is undesirable stock likely to damage furnaces. The supply of steam coal is being augmented somewhat by shipments of slack from mines in Ohio, but not all of the industrial plants are able to handle the fine coal to advantage. Only the continuance of unusually mild weather throughout the month so far has saved hundreds of household consumers from experiencing hardship and suffering. The favorable conditions have made it possible for retail dealers to speed distribution to an unusual degree, despite the handicaps of shortage of labor and, at times, deficient coal supply. The latter difficulty has been relieved by the action of the Federal Fuel Administration in placing an embargo on shipments of domestic lump and prepared sizes from Ohio, West Virginia and Kentucky, except when sent for domestic use or for gas and byproduct plants or railroads. Mine run later was made available for use of the domestic consumers.

**Anthracite**—Improvement in volume of anthracite receipts, though not very great, has tended to aid in relieving the situation. Base-burner users are still receiving most of the anthracite distributed.

**Lake Trade**—Coal is moving freely over the lake routes and from present indications shipments in October will exceed 5,000,000 tons. For the week ending Oct. 19 vessels loaded more than 1,800,000 tons of cargo coal.

## COLUMBUS

**With a serious reduction in output in Ohio fields as a result of the influenza epidemic, the Ohio coal trade is in a rather uncertain condition. There is still a good demand for domestic and lake tonnage. Screenings and mine-run are rather plentiful.**

The outstanding feature of the coal trade in Ohio is the reduction in output due to the prevalence of Spanish influenza, which has become widespread in mining districts. But the output has not been curtailed as much as might be expected under the circumstances, although it is a serious reduction. There is a marked car shortage on certain railroads, more especially the Toledo & Ohio Central and the Kanawha & Michigan. The shortage appears to be due largely to a lack of train crews to handle the trains promptly. The output in the eastern Ohio field is reduced to about 60 per cent. of normal. In the Pomeroy Bend district it is about 50 per cent., and in the Hocking Valley and Jackson fields it is about 65 per cent.

The domestic trade rules firm in every particular. Retailers have accumulated rather large stocks in order to be in a position to take care of the rush when colder weather arrives. There is a good supply of mine-run in the yards of retailers, but lump is not so plentiful. As a result dealers are in the market for prepared sizes. Retail prices are firm at the levels which have prevailed for several weeks. Pocahontas is not out of the market. There is a fair supply of West Virginia splints, but on the whole the bulk of domestic tonnage comes from Ohio mines. Reports show that a much larger tonnage than ever before has been stored up to the present by householders.

Lake trade is rather active, despite the general reduction in production. The docks of the lower lake ports are busy loading vessels which are being moved promptly. The upper docks are in good shape as the interior movement is prompt. Prospects are for a complete supply for the Northwest unless something unforeseen occurs.

Steam trade is rather slow in many respects, largely due to the oversupply of screenings and mine-run on the local market. Some modifications of the embargo against shipping those grades into Michigan have been received, but these are not yet sufficient to relieve the situation. Storage in the hands of large steam users is up to the limit, and in many cases in excess of the amounts permitted by the Federal Fuel Administration.

## CINCINNATI

**Production and shipments have been reduced by influenza among miners and railroad men, but demand is not heavy, as weather continues moderate.**

In spite of the high degree of activity among industrial plants in this section, calling for a correspondingly large consumption of coal, conditions have brought about the old-fashioned state of a weather market, a thing which was hardly anticipated for this fall or winter. The answer seems to be that storage by domestic consumers, and, to a large extent, by others as well, coupled with such shipments as are coming forward, is taking care of all needs very nicely.

So far during the current month the weather has been mild and pleasant, with very little rain and only a few frosty nights. Inasmuch as the prevalent epidemic of influenza has hit the mining regions hard, this is especially fortunate, as it seems that so many men have been out of the mines on account of illness that production could not possibly have kept pace with a heavy demand. In some sections as high as 50 per cent. of the men have been ill, reducing production to a corresponding extent. However, indications are that the epidemic is on the wane in this section, and it is hoped that another week will see it virtually at an end.

## LOUISVILLE

**A decrease of 50 per cent. in coal production of the state is claimed as a result of the influenza epidemic. Demand for Western Kentucky domestic draggy. Steam coal generally draggy, as industrial consumers are well stocked, and industrial consumption is lighter due to curtailment on account of illness of employees.**

The influenza epidemic is having a serious effect on the coal man at the present time. Many large industrial plants are operating on one wheel due to the shortage of hands brought about by illness, this reducing industrial demands considerably. Domestic demand is dull on account of mild weather, with the result that a slight surplus stock is being accumulated in the local yards. Much trouble is being experienced in securing hands for unloading coal from cars.

At the present time the western Kentucky mines are so short of hands that many of them are down, and the car supply for the first time in months is showing a surplus, although it would be a shortage with normal shipments.

In eastern Kentucky the car supply is fairly adequate for the small shipments moving. It is estimated that the mining sections are not operating more than 50 per cent. full as a whole, as many of the mines are closed.

### BIRMINGHAM

**Steam market soft despite the restricted output. Domestic demand continues strong while the supply is short. Sickness proves disastrous to production.**

Steam coal in the local market is reported easier than at any time before in months, and some distributing agencies report some effort is being required to dispose of the full tonnage at their command. Some industries are said to have accumulated several months' supply ahead and have had shipments suspended temporarily, though railroad fuel is moving in about the normal volume.

There is no semblance of softness in the domestic trade and dealers are unable to get anything like the desired tonnage to fill orders in hand. There is very little coal on local yards, and not an infrequent sight to see them completely bare.

Production took a big slump for the week ending Oct. 12, the output being only 382,846 net tons, or 26,000 tons less than the previous week. This loss was due in a measure to the large number of mine workers suffering from influenza, the epidemic being very much worse during the week just past. Numbers of operations in Walker County worked not more than half time last week while others were closed down entirely. The situation is still serious, both as regards coal production and physical distress. Mines in Jefferson County have also been affected to some extent, particularly in the western part of the county.

Transportation service is now good and ample cars are being supplied. The tug boats and barges purchased by the Government from private interests operating them on the Warrior River in handling coal to New Orleans, Mobile, and other points are now being repaired and will be placed in service soon. It is announced that the Government has appropriated $6,170,000 for the purchase of six towing steamers and 40 steel barges for use in the Mississippi and Warrior Rivers, the barges each having a capacity of 2000 tons.

## Coke

### CONNELLSVILLE

**Production reduced by influenza. Extensive inoculation. Efforts to speed production continue under handicaps. Market conditions unchanged. Blast furnaces fairly well supplied.**

Production of coal and coke in the Connellsville region has suffered seriously from the influenza epidemic. Output in the week ended Oct. 19 showed a noticeable curtailment, while there has been a further loss since then. The medical staff of the H. C. Frick Coke Co. took measures early against the disease and have inoculated all employees with the "anti-flu serum," while they are now inoculating members of employes' families when requested. Many of the independent operators are inoculating their men. While the number of cases in the region is large the mortality is reported much lower proportionally than in other districts. Precautions are being taken against men returning to work too soon.

All the machinery of W. L. Byers, production manager for the district, to stimulate production of raw coal and of coke is in operative condition, but actual work in the campaign has been materially interfered with by the epidemic, particularly by the impossibility of holding meetings. Good results are expected in the long run, however. No material shortage of coke is reported by blast furnaces, which seem in nearly all cases to be well supplied, though there is little opportunity to accumulate stocks. There remains much complaint as to the quality of beehive coke furnished, although there has been some improvement since the Fuel Administration started its vigorous campaign nearly two months ago to bring about an improvement in quality. Some furnace managers estimate that one-third the coke operations have shown a market improvement in quality of coke turned out.

There are practically no market transactions in furnace coke, the current output moving against contracts or allocations. In foundry coke there is a little activity and foundries engaged in important work can generally secure supplies without much difficulty. A good trade continues in screenings from old dumps, for household use, and present operations have enough material as a rule to keep them going for two months or longer. The market remains quotable at the set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over ¾-in., $7.30; clean screenings from old dumps, over ½-in., $5.50 per net ton at ovens.

The "Courier" reports production of coke in the Connellsville and Lower Connellsville region in the week ended Oct. 19 at 314,045 tons, a decrease of 8875 tons, and shipments of coal out of the region at 246,078 tons, a decrease of 20,475 tons.

**Buffalo**—The supply is fairly good to the smelting furnaces and is likely to continue, as this district is pretty well provided with byproduct plants. Some jobbers in fuel coke complain of careless preparation, consumers finding it with a high percentage of dirt and other foreign matter. An effort will be made to correct the abuse. Prices run from $2.75, a cut, to $7.68, a regulation figure, at the ovens. Only government prices are allowed on smelting coke. Lake receipts of iron ore are still good, being 367,591 gross tons for the week.

## Middle Western

### GENERAL REVIEW

**Mining districts suffer from influenza epidemic. Market continues weak in both steam and domestic szes. A serious situation predicted for first of year if steam users do not come into market early.**

Influenza has a strong foothold in the mining districts of Illinois, and the situation today is more than serious. We are advised that the tonnage for the week will suffer heavily, some authorities going so far as to state that the production figures will be decreased from 25 to 50 per cent. It will not be a surprise to anyone in close touch with operating conditions in Illinois if the epidemic becomes as serious as it is in the anthracite fields of Pennsylvania and the southeastern district of Kentucky.

Market conditions in the Middle West remain, generally speaking, unchanged. In spite of the fact that coal-carrying equipment continues to move to the mines in the east, and in spite of the fact that the man shortage caused by influenza is beginning to be felt, the market continues weak, both on steam and domestic sizes.

The weakness of the steam market is explained easily, as the majority of the manufacturers have enough coal on hand to last until the latter part of December or the early part of January. The domestic market appears to be purely a weather proposition, and as the weather in this territory has been unusually mild, there has been little purchasing on the part of the retailer.

A number of operators are looking forward and predicting what will probably happen about Jan. 1. As we stated before, the average steam coal user has enough fuel on hand to last until this time, and consequently will not be interested in purchasing additional coal until at least the latter part of this year. As a natural result, the operators will be swamped with orders—far more than they can begin to take care of—and the manufacturers will be out of coal. It will naturally follow that there will be a panic similar, if not more serious, to that experienced last winter. The only way to avoid this threatened state of affairs is to advise the steam user to come into the market early, and gradually; otherwise, nothing can hinder a very serious situation.

### CHICAGO

**Most of the large industries are well supplied and are not interested in coal. No improvement in the anthracite situation.**

Steam coal continues to be offered freely, a substantial tonnage of it at a discount, and little interest is taken in it by the average purchasing agent. Most of the industries have a big supply of coal on hand, and no coal to speak of is being purchased, in spite of the fact that operators are predicting freely what will happen to the tonnage production from the influenza epidemic and from the probable car shortage.

Little interest is shown in anything but the high-grade and well prepared coal from the southern part of the state. As soon as a cold snap comes, operators are anticipating a strong market on all domestic coals, but until then the retail trade will continue weak and erratic.

The anthracite situation does not appear to improve much from day to day. The epidemic in the hard coal field of Pennsylvania will further hinder any favorable developments, and the retailers in Chicago are expressing, pretty generally, an intense dissatisfaction in the manner in which the State Fuel Administration is handling the anthracite problems.

### ST. LOUIS

**Market continues with a surplus of all coals. Mild weather and no domestic demand. Steam business easy and light, and no storage purchases. Country Demand slow. Cars plentiful and transportation good. Tonnage decreasing.**

The local situation is one that continues serious for both operator and retailer. With unbilled coal at the mines in the Standard and Mt. Olive field, the operator cannot look ahead to any extent without figuring idle time on account of no orders. With the domestic demand in St. Louis filled, the retailer finds his equipment idle and his stock eating up the profits.

In the face of these conditions, the Fuel Administration at Washington has not consented to eliminate the zone lines as far as shipments to western Missouri, Nebraska, Iowa and the Northwest are concerned. In these places, which in the past have been the logical territory for Illinois coal, there is a scarcity of fuel.

There are no prospects of any business developing in St. Louis until real, cold weather comes, and that business will be light, both as regards steam and domestic.

The country demand within the zone of Illinois fuels in Missouri and the southeast is pretty well taken care of. Car supply is plentiful and transportation shows considerable improvement.

In the Standard and Mt. Olive field there has been a decreased tonnage at many mines on account of the influenza epidemic. This is not so serious as in the Carterville field, where one-fourth of the men at some mines are idle on account of sickness, and in some places in the state some mines are idle altogether on account of sickness of the engineers, firemen, and other essential men, whose places cannot be readily filled.

The railroad tonnage from all the fields in Illinois continues good. That is the only thing that is keeping business going in the Standard and Mt. Olive fields.

There is still a good tonnage of domestic booked in the Carterville field moving north, but the demand for that coal in the southwest is easy and light, excepting on the Iron Mountain lines proper.

There is no outside coal coming in to speak of, excepting a few cars of Arkansas anthracite, and there is no change in the local price from that of the past few weeks, excepting that Standard 2-in. lump is down to $2.25 and $2.30, and screenings around $1.50. All other coals seem to be holding their own, at the Government maximum, in the face of the surplus.

The prevailing market prices per net ton f.o.b. mines, are:

| | Williamson and Franklin County | Mt. Olive and Staunton | Standard |
|---|---|---|---|
| 6-in. lump... | $2.55@2.75 | $2.55@2.75 | $2.40@2.70 |
| 3x6-in. egg.. | 2.55@2.75 | 2.55@2.75 | 2.40@2.70 |
| 2x3-in. nut. | 2.55@2.75 | 2.55@2.75 | 2.40@2.70 |
| Washed: | | | |
| No. 1..... | 3.05@3.20 | 3.05@3.20 | ..... |
| No. 2..... | 3.05@3.20 | 3.05@3.20 | ..... |
| No. 3..... | 3.05@3.20 | 3.05@3.20 | ..... |
| Mine Run.. | 2.35@2.50 | 2.35@2.50 | 2.20@2.30 |
| Screenings.. | 2.17@2.32 | 2.17@1.32 | 1.50@1.60 |

Special prepration on Carterville is 10 cents extra.
Williamson & Franklin Co. rate is $1.10.
Other fields 95 cents.

### SEATTLE

**Fuel Administration to conduct campaign of conservation throughout the Northwest. Railroad consumption to be given first attention.**

A campaign for the conservation of coal is to be inaugurated throughout the Northwest at once by the United States Fuel Administration, the first effort being confined to the various railroads operating in this section, following which the education will extend to power plants and other industries. E. P. Roesch has been appointed supervisor for the entire district and will have his offices in the Union Pacific depot with W. C. Wilkes, assistant to the regional director, railway administration. The department is not connected with the railroad administration, however. The first meeting called by Mr. Roesch was attended by the railroad superintendents, trainmasters, roadmasters, master mechanics, superintendents of bridges and buildings, road foremen and the chairmen of the brotherhoods of trainmen, and ways and means discussed in unloading and firing locomotives with reference to fuel conservation.

The retail coal trade in Seattle reports a brisker movement in winter storage coal, due likely to the persistent reports here that prices of fuel are to be materially advanced before November and to the curtailment of coal supplies to certain industries. While the curtailment does not apply to home consumers, it has caused a flurry among those who were overanxious.

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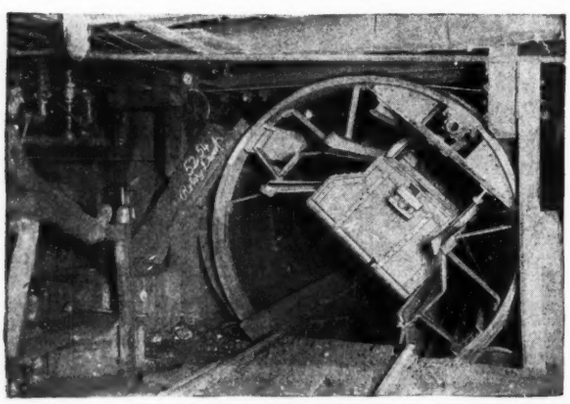

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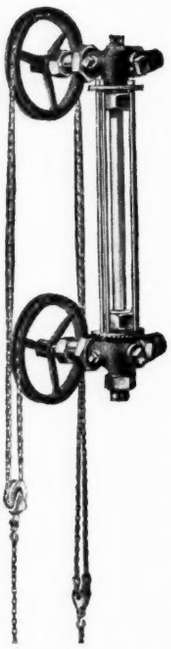

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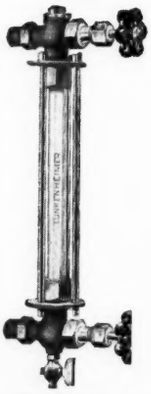

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